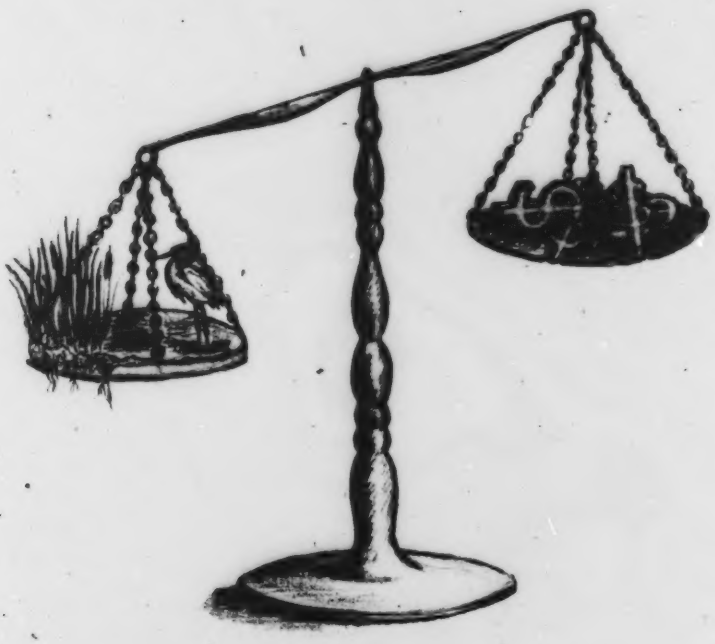
WETLAND MITIGATION AND COMPENSATION

Proceedings of a National Workshop



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Proceedings of a National Workshop

April 22–24, 1997
Ottawa, Ontario

Compiled by
Kenneth W. Cox
and
Allison Grose

Report No. 98-1

North American Wetlands Conservation Council (Canada)

FOREWORD

Wetland modification and destruction has occurred all across Canada during the last century. Canadians have lost significant portions of their natural land base and undoubtedly these stresses on watersheds and other ecological systems over time have put pressure, in some regions significant pressure, on the biodiversity and wildlife in Canada.

In the last half of the twentieth century, with population increasing, economic development flourishing and environmental stress factors rising on our natural world, the concern over the quantity and quality of our remaining wetlands and wetland systems has never been greater. This concern is increasingly being expressed by conservation groups, the public and governments. Many people in the housing, utility and industrial sectors are also showing concern for natural resource conservation during the design, construction and delivery of their products and services.

For Canadian society to benefit from wetlands socially and environmentally in an economy increasingly tied to global influences and global demand for products and services, greater care must be taken not to weaken or destroy natural systems. A national workshop on wetland mitigation and compensation is the focus of this report. It addresses past and current thinking and activity regarding developmental pressures on wetlands and begins to outline how to minimize impacts on wetlands or wetland systems. It also provides some recommendations for future action to further document and act on wetland developmental pressures in Canada.

I urge you to read and comment on the document. It is one step in a multi-step initiative regarding mitigation and compensation for wetlands in Canada, one which the Wildlife Conservation Branch of the Canadian Wildlife Service, in partnership with the North American Wetlands Conservation Council (Canada) both encourages and supports.

Robert S. McLean
Acting Director
Wildlife Conservation Branch
Canadian Wildlife Service
Environment Canada

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WILDLIFE HABITAT CANADA

CONTENTS

Foreword iii

Acknowledgements vii

Introduction 1

Background Papers:

Wetland Mitigation and Compensation in Canada
Robert O. Bailey 5

A Brief Overview of U.S. Experience with Wetland Compensation and Mitigation Banking
Kevin K. Loftus and W. Dan Mansell 31

Abstracts of Presentations:

The Department of Fisheries and Oceans' Approach to Fish Habitat Mitigation and Compensation
Glen Hopky 47

The Canadian Policy Setting for Implementing Wetland Mitigation
Clayton Rubec 49

Ontario's Experience with a "No Loss" Wetland Policy: Is There a Role for Compensation?
Kevin K. Loftus and W. Dan Mansell 50

Wetland Compensation and Mitigation: A Western Perspective
Trevor Swerdfager 54

U.S. Experience with Wetland Compensation: Lessons and Recommendations
Jon Kusler 55

Summary and Recommendations 61

Appendix A: Workshop Agenda 65

Appendix B: Workshop Participants 67

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Finally, thanks again to those who participated, including a special thank-you to our U.S. friends who attended and contributed so much to the success of the workshop.

INTRODUCTION

In the past decade there has been an ever growing interest in the importance of wetlands, and increasing concern about their continuing loss. There has been some progress in wetland policy development, but ongoing conflicts surrounding wetland management, and backlashes against regulatory measures, have set the stage for an examination of alternative conservation management strategies. In late 1996, the North American Wetlands Conservation Council (Canada) (the Council) launched the **Wetland Mitigation and Compensation Project** to examine the state of mitigation and compensation policy, perspectives and practices in Canada.

The Council was established by the federal Minister of the Environment in 1990. One of its key roles is the facilitation and monitoring of the development and implementation of wetland policies and wetland awareness programs in Canada. Among its activities in its eight-year history, the Council has been involved in an examination of the state of Canadian wetland policy, and has organized a workshop on policy implementation. In conjunction with a number of its partners, the Council developed a highly-regarded Wetland Evaluation Guide, and has developed a course to aid in the implementation of wetland policies. It recognized a need for changes in the tax system to remove barriers to wetland conservation, and was instrumental in having changes made to the *Income Tax Act* regarding the donation of ecologically sensitive lands.

Continuing in this tradition, the Council recognized a need to address the issue of using mitigation and compensation procedures to help conserve wetlands. In part this was driven by several high profile development projects that had the potential to seriously affect wetlands. These include the Confederation Bridge from New Brunswick to Prince Edward Island, the construction of a parallel runway at the Vancouver International Airport and the construction of a portion of the Trans-Canada Highway through the Grand Lake Meadows wetland in New Brunswick. The highway to be built through Grand Lake Meadows is the first development to affect a project under the North American Waterfowl Management Plan (NAWMP). The Council is the senior administrative authority for implementation of the NAWMP. In each case, negotiations for mitigation activities and compensation packages had to be undertaken, and it became evident that no comprehensive principles and guidelines existed for developing these agreements. Having identified this need, the Council started the Wetland Mitigation and Compensation Project.

On April 22 to 24, 1997 the Council convened the **National Workshop on Wetland Mitigation and Compensation** in Ottawa, as part of an ongoing process to further the dialogue among experts, practitioners and decision-makers in Canada on mitigation and compensation measures and processes and their role in wetland conservation. The process started with the identification of people in the public and private sectors with experience in the field of mitigation and/or compensation. Detailed interviews were conducted over a three-month period, and the results were

summarized in a background report for the workshop. This process continues with the publication of these proceedings.

The workshop was structured around two background papers, several presentations, a panel discussion and four breakout group discussions. The background papers were to give focus to the discussions. The first, *Wetland Mitigation and Compensation in Canada* by Robert O. Bailey, summarizes the results of the interview process referred to above, and reflects current Canadian perspectives on mitigation and compensation. Because the United States has a longer history of dealing with wetland mitigation and compensation issues, it was felt that examples of wetland conservation processes and policies on these issues from the United States should also be explored. Accordingly, the second background paper, *A Brief Overview of U.S. Experience With Wetland Compensation and Mitigation Banking*, by Kevin K. Loftus and W. Dan Mansell, reflects the American experience. In particular, it examines the successes and failures, and potential advantages and disadvantages of mitigation banking.

The perspectives and experiences with mitigation and compensation were found to vary widely, because of both geographical and sectoral differences, and the presentations made to the workshop participants reflect this. A brief abstract of each presentation follows the background papers.

The members of the breakout groups also represented diverse interests. Each group had one or more wetland experts from the United States and a diversity of wetland expertise and interests from across Canada. Members were asked to familiarize themselves with the material from the two background papers and each group was charged with four tasks:

- develop definitions for the terms used in wetland mitigation and compensation;
- propose a set of national principles for wetland mitigation and compensation;
- develop a draft set of national guidelines to achieve wetland conservation through mitigation and compensation procedures and practices; and
- use the definitions, principles and guidelines developed by the group to address wetland conservation requirements in the case studies provided.

Each group reported an overview of its results to the plenary. These results have been integrated as part of the summary and recommendations.

This document brings together the background papers, abstracts of the presentations and recommendations drawn from the workshop. It is hoped that the workshop, this paper and subsequent initiatives will lead to the development of principles and guidelines that can be used to help conserve wetlands under development stress through use of mitigation and compensation procedures.

BACKGROUND PAPERS

*WETLAND MITIGATION AND COMPENSATION IN CANADA**

Robert O. Bailey
Environment & Resources Inc.

INTRODUCTION

In the fall of 1996 the North American Wetland Conservation Council (Canada) (NAWCC) launched a national initiative called the **Wetland Mitigation and Compensation Project** aimed at assessing the views and experiences of governments, industry sectors and national non-government organizations on wetland conservation through mitigation and compensation. People with wetland or fish habitat mitigation/compensation experience were identified in public and private sector organizations and a detailed interview was undertaken. Results of this review are presented herein as a background paper for the national workshop.

The purpose of this document is to provide an overview of key concepts, reactions from across the country and perceptions raised during the interview process. The wealth of information gathered is condensed as a reference tool.

A few general observations and qualifiers follow:

(1) Overall, there is relatively little Canadian experience in wetland mitigation, and even less in compensation. Most Canadian experience in compensation issues has resulted from applications of the *Policy for the Management of Fish Habitat* under the *Fisheries Act;*

Overall, there is relatively little Canadian experience in wetland mitigation, and even less in compensation.

(2) The Canadian experience in wetland and fish habitat conservation through mitigation and compensation is highly variable. Approaches are tempered by social, economic, environmental and political factors which are shaped by the inherent nature of the landscape, and the array of social-economic opportunities it presents. For example, traditions and attitudes toward issues such as land ownership vary extensively presenting different constraints and opportunities for mitigation and compensation approaches. As a consequence, workshop participants are unlikely to find that "one size fits all" jurisdictions in issues such as compensation. It may be more useful to approach wetland conservation through mitigation and compensation in two steps:

** The opinions expressed in this paper are not necessarily those of the North American Wetlands Conservation Council (Canada) (NAWCC), Environment Canada, nor of the author. The NAWCC does not endorse nor propose any of the views presented herein. Several respondents requested anonymity and it is applied to comments throughout.*

first by developing a set of comprehensive principles that are basic and necessary to all approaches, and then by laying-out options and tools as a set of guidelines;

(3) This paper is not a thorough review of the myriad of policies, acts and regulations affecting wetland conservation at jurisdictional levels in Canada. The review will highlight the comments of respondents familiar with policy and legislative approaches; and

(4) Text and interpretations are kept to a minimum. Extensive commentary has been reduced to point form. The interview notes have been revisited on several occasions to ensure all views are presented.

Workshop participants had the key role of sorting the concepts, options and tools based on the information provided and their own experiences.

DEFINITIONS

A few basic definitions were established.

Mitigation and Compensation:

Several respondents felt it was important to develop consistent, Canadian definitions for terms used in wetland policy statements. It became evident during the interview process that more consistency exists among practitioners across the country in their understanding of terms such as avoidance, mitigation and compensation than exists in the official definitions used by several agencies and industry. It will be key for the workshop participants to develop a consensus on the use of these terms.

The majority of respondents viewed mitigation and compensation as separate steps in an overall approach. Mitigation was most often considered as a step ahead of compensation in a sequence starting with avoidance and ending, if necessary, with compensation. Most respondents preferred to base mitigation and compensation measures on functional criteria, as opposed to wetland area lost or altered *per se*.

Mitigation was generally perceived to include steps taken to minimize potential impacts through adjustments, modifications and other actions occurring in the project design stage and/or on site during the construction phase. These measures are aimed at offsetting any potentially negative impacts of the project on wetland functions and values. Some respondents suggested there was a need to clearly define "avoidance" in relation to mitigation. Others introduced the term "attenuation" to describe all measures taken, relating to a specific site to avoid or minimize impacts.

Compensation was generally seen to include a wider range of potential actions aimed at offsetting losses of wetland functions and values which remain after mitigation or "minimization" measures have been applied. It was recognized that in some cases the mitigation step in the sequence is skipped, with

proponents going straight to compensation. Respondents were strongly opposed to a lack of appropriate consideration of avoidance and mitigation in the planning and development stages of projects. The majority of respondents view measures such as habitat creation, restoration or enhancement off-site as compensation. Compensation is aimed at offsetting the losses of functions and values that remain after all other steps in the sequence have been taken. Although money was generally accepted as a compensatory option, it was the least preferred method of offsetting losses of wetland functions and values.

Examples of some definitions currently in use:

(1) Implementation Strategy No. 2: *The Federal Policy on Wetland Conservation (1991):*
[The federal government will] develop guidelines to ensure mitigation of the impacts of federal government activities affecting wetland functions and, where appropriate, develop compensatory measures.

(2) *The Federal Policy on Wetland Conservation: Implementation Guide for Federal Land Managers (1996):* On page 10 under Guidelines for achieving "no net loss" of wetland function:
"Development of no net loss (NNL) directives should be guided by [the document entitled] *No Net Loss: Implementing No Net Loss Goals to Conserve Wetlands in Canada* and should contain the following elements:

- A sequence of mitigation alternatives (e.g. "avoidance" of impacts, "minimization" of unavoidable impacts, and "compensation" for unavoidable impacts), with criteria associated with each option;
- Compensation requirements (i.e. related to function or area basis, type of wetland, geographic context, time frame), including definition of priorities and criteria;
- Compensation alternatives to restoration or creation of wetlands (direction on the acceptability of mitigation banking or non-wetland creation activities in working toward NNL goals); and,
- Monitoring and maintenance requirements."

(It is evident from this discussion that "mitigation" includes all elements of a sequence from avoidance to compensation.)

(3) Fisheries and Oceans Canada *Policy for the Management of Fish Habitat /Glossary (1986):*
Mitigation: Actions taken during the planning, design, construction and operation of works and undertakings to alleviate potential adverse effects on the productive capacity of fish habitats.

(4) *Manual of Implementation Guidelines for the Ontario Wetland Policy Statement, (1992) Appendix C:*
Mitigation: The possible mitigation of damage caused by the construction, operation or maintenance of a proposed use of or development will be one factor in the consideration of an Environmental Impact Statement. The Policy does not provide for "compensatory replacement".

(5) *A Guide to the Canadian Environmental Assessment Act (1993):*
Mitigation: means the elimination, reduction or control of the adverse effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

(6) *Interim Alberta Wetland Policy /Glossary (1994):*
Mitigation: The process of rectifying an impact by repairing, rehabilitating or restoring the affected environment; or the process of compensating for the impact by replacing or providing substitute resources or environments. It can also be defined as the restoration, creation or enhancement of wetlands to compensate for wetland losses associated with human activities.

(7) Canadian terminology from K. Loftus and D. Mansell (page 32)
Mitigation: actions taken to prevent and/or minimize the negative impacts of an undertaking on wetland functions and/or area.
Compensation: actions taken at another location to offset the negative impacts of an undertaking on wetland functions and/or area of a particular wetland, where such impacts can not, or will not, be mitigated.

(8) United States terminology from K. Loftus and D. Mansell (page 32)
Mitigation: avoiding the impact altogether by not taking a certain action; minimizing impacts by limiting the degree of action; rectifying the impact by repairing, rehabilitating or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations; and compensating for the impact by replacing or providing substitute resources.

Enhancement:

Enhancement was generally understood by respondents to include those actions that enhanced a particular wetland function and value, or set of functions and values. Enhancement may apply to functions and values on a site under development, or refer to enhancement undertaken elsewhere as a component of a compensation agreement.

Policy Definitions:

No Loss (NL): usually applies to wetland area and sometimes also to function. It can also include variations such as some loss of area but no loss of function. No loss policies do not tend to include a provision for compensation should actual losses occur. The *Ontario Wetland Policy* is the best known example.

No Net Loss (NNL): pertains principally to losses of wetland functions and is used in a functional context by most respondents. NNL of wetland function is described as a goal for federal lands and waters under the *Federal Policy on Wetland Conservation.* Guidelines for implementing the policy

suggest that NNL may apply to area in some cases. NNL also appears under the federal *Policy for the Management of Fish Habitat* (see below).

Net Gain (NG): the federal *Policy for the Management of Fish Habitat* has as its overall objective a net gain in the productive capacity of fish habitats to support directly or indirectly fish stocks or populations which sustain commercial, recreational or First Nations' fishing activities. There are three goals under this objective:

(1) to maintain the current productive capacity of fish habitats supporting Canada's fisheries resources, such that fish suitable for human consumption may be produced; no net loss of the productive capacity of habitats appears as the "guiding principle" under this goal;

(2) to rehabilitate the productive capacity of fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource — here the policy stipulates that damaged habitats should be restored in such a way that there is a net gain of habitat for the nation's fisheries resources; and

(3) to improve and create fish habitats in selected areas where the production of fisheries resources can be increased for the social or economic benefit of Canadians — this goal is achieved by manipulating naturally occurring processes and factors (enhancement) or by providing new access to spawning, rearing and food producing areas.

No Policy: non-policy based options for wetland conservation through mitigation and compensation have been applied successfully and will be discussed below.

WETLAND POLICY OPTIONS

No loss policies offer the least opportunity for compensation processes. Nevertheless, NL approaches are used in some jurisdictions across Canada to protect critical wetland habitats under provincial legislation.

The no loss policy for wetlands in southern Ontario was designed to prevent further losses of remaining wetlands in an area of intensive urbanization and industrial development. Although most respondents agree with the intent of NL policy, in practice some problems have surfaced in this approach. Rigid enforcement of NL provisions can cause wetland property values to be affected and landowners to contemplate possible actions to eliminate or decrease wetland values on their land.

No loss policy can result in win-lose scenarios between landowners, proponents and conservationists, and in some instances, encourage lengthy litigative processes, which appear at odds with concepts of

wise and continuing use of resources. The principal disadvantage of a NL approach is that it may not provide an avenue for compensating wetland losses when a decision to override the policy occurs.

Notwithstanding these difficulties, many respondents proposed that a NL policy combined with other, more flexible approaches remains a viable policy option for protecting critical wetlands today. Overall, the NL option may be more viable embedded in a planning approach based on ecosystem management. The location and justification for protecting these sites should be available to proponents and the public, to avoid costly and acrimonious litigative processes.

The principal disadvantage of a No Loss approach is that it may not provide an avenue for compensating wetland losses when a decision to override the policy occurs.

Net Gain policies are not in effect in regard to wetland conservation, although respondents generally consider NG a variable policy alternative in certain cases. For example, critical wetland habitats may be protected by a NL policy within a jurisdiction. The next most valuable wetland class could be protected on a NG basis. In these wetlands, proponents choosing to proceed would face substantially higher compensation costs, which may act as a deterrent to the development of the second most valuable wetland habitat component.

No Net Loss of wetland functions was recognized as the policy option with the most potential as a practical solution to handling the bulk of issues related to wetland conservation and development. Most (but not all) respondents suggested that NNL has a measure of applicability in the overall policy approach within a jurisdiction. The utility of NNL was predicated upon an acceptance that developments and impacts will occur in wetlands, and that NNL offers a framework for building sustainable solutions from an environmental, economic and social perspective. At the same time it is important to realize that only so much loss of a finite resource such as wetlands can occur before permanent damage is done.

No Net Loss of wetland functions was recognized as the policy option with the most potential as a practical solution to handling the bulk of issues related to wetland conservation and development.

NNL is viewed as one component of a comprehensive approach to wetland conservation through mitigation and compensation by most respondents. The approach is based on a sequence of prioritized actions that would be initiated in response to a development proposal. The first priority in the sequence is avoidance. All measures should be undertaken to avoid direct impacts on wetlands and indirect impacts such as alteration of vegetative cover in uplands that would result in soil erosion and infilling. If the wetland impacts cannot be avoided, the second step is to mitigate impacts on functions within the wetland or in the surrounding uplands. If a net loss of function persists following mitigation, these losses should be compensated. There was broad acceptance of a sequential approach to NNL policy applications.

POLICY APPROACHES AND PRACTITIONER'S PERSPECTIVES

Although the policy concepts are straightforward, where, how and to whom they would apply is uncertain, particularly in the area of compensation under a NNL approach. The experiences and attitudes of respondents with a working knowledge of wetland and/or fish habitat mitigation/compensation, gathered during the interview process, provided a wealth of input guidance on policy concepts and application.

Five areas were highlighted by survey respondents:
(a) Leadership and Guiding Perceptions;
(b) Flexibility, Fairness and Consistency;
(c) Environmental Sustainability;
(d) Economic Sustainability; and,
(e) Social Sustainability.

A. Leadership and Guiding Perceptions

Policy guidance is needed because in the absence of policy, decisions are made on an ad hoc basis. In addition, it is difficult to explain the differences in decisions that arise through an ad hoc approach to landowners, developers and industry. To be effective, policy should be incorporated into agency programs, and, in fact, a primary target of wetland policy is other government departments at the provincial, territorial and federal levels. This would ensure broader assessments of activities and in planning.

Policy should have a philosophical underpinning consistent with national and international conservation agreements. It should maintain ideals, even though they are not always achievable in practice. With wetlands specifically, policy should be driven by stewardship and protection of the public interest, which can best be addressed by devising a sequential approach through avoidance (including whether to allow development or not), mitigation and compensation. Policy should include both incentives and deterrents, but economic instruments are likely to be more effective than a challenge approach.

Roles and responsibilities must be sorted among different levels of government and in industry, and must be identified for individual stakeholders. The question of who is being addressed must be answered, along with the parallel question of who reaps the benefits and who bears the costs. Who will the principles, guidelines, regulations and penalties be directed towards?

The policy and process solution must be sustainable from an environmental, social, political and economic perspective.

The policy and process solution must be sustainable from an environmental, social, political and economic perspective, and must appear reasonable to the public, politicians and the business

community. It is essential that business be allowed to continue without taking away environmental benefits and opportunities. However, avoidance of wetlands should be the primary policy approach, and, failing this, the preservation of wetland functions.

B. Flexibility, Fairness and Consistency

Trade-offs, compromise and flexibility are vital components of successful policy implementation. On the other hand, consistency is also crucial, within and among levels of government and the private sector. Policy terms and definitions should be simple and consistent across the country. Predictability of requirements is important for the process to be perceived as fair. For example, there should be no flexibility in some issues such as water quality, and this should be an explicit, predictable requirement.

Of course, ecoregions are different and there are also different social contexts that must be taken into account. What is possible in one province may be difficult in another with respect to private land, so a one-size-fits-all solution is impossible. In general, flexibility in policy application should be high where habitat capacity for an affected function is not limiting overall ecosystem functioning or resource values — compensation requirements should be diverted toward major limiting factors in these situations.

C. Environmental Sustainability

It is necessary to use a holistic, ecosystem-based approach in policy; single issues and individual agendas are not easily defended. The emphasis in policy must be on avoidance and risk reduction, because the scientific knowledge and monitoring capabilities are not available to do the conservation job through mitigation and compensation. In addition, ecosystems are dynamic, and mitigation/compensation measures break down over time. However, should compensation be necessary, wetland functions should be restored on-site or in the same watershed or ecosystem. Elements of timing, season and wetland habitat types for certain species should also be considered.

Policy directives and guidelines must be supportable from a landscape perspective, and policy options should be variable with the landscape and wetland quality, quantity and type. A watershed management-ecoregion approach is needed to include all values and all stakeholders. Policy directives and guidelines should consider the differences in replacement or restoration potential among wetland classes. For example, in some cases, marshes and swamps can be created or restored much more easily than bogs and fens. It is also important to emphasize interrelationships rather than isolated bodies of water.

D. Economic Sustainability

There is a need for an effective, non-confrontational approach to wetland protection. The approach must be understood by proponents, and be straightforward and sensible. Opportunities for net gains

in wetland and wildlife values which are also of value to agriculture or other working landscapes should be explored: we need both wildlife and economic development, not "either/or." Wetlands and wildlife will not prevail in win-lose scenarios. Cost effectiveness of solutions must be considered, but the least-cost solution is not necessarily the best.

E. Social Sustainability

It is important that awareness be a policy driver within and outside government, so policy initiatives should be accompanied by awareness and/or public education programs. Public education and awareness is key because the preventative model for ecosystem and resource management is much cheaper than remediation and restoration.

There is a need for innovative methods to build awareness and social support for conservation policy such as the "wellness model" developed by the Department of Health in Saskatchewan. It shows the reduction in costs to taxpayers achieved through the provision of clean air, water and outdoor recreation; other initiatives show savings to agriculture through soil conservation, use of natural pest control and natural methods of crop pollination.

Policy options and applications must appear reasonable to people. They must be consistent with public attitudes, such as attitudes towards land ownership in eastern and western Canada. In win-lose situations, the loss of local control over land use causes social backlash against conservation land use. The policy approach should be directed toward encouraging a community focus on responsible action and should be proactive with respect to conservation and public interest or stakeholder groups.

POLICY ISSUES AND PRACTITIONER'S PERSPECTIVES:

Survey respondents focused on four themes:
(a) No Net Loss;
(b) Mitigation;
(c) Compensation; and
(d) Mitigation Banking.

A. No Net Loss

No net loss of wetland function was widely accepted (with some notable exceptions) as the policy concept of choice among government, industry and NGO respondents. A fundamental principle of NNL is that the first choice in the sequence is no loss, as achieved by avoidance, then mitigation as the second choice. It should

A fundamental principle of NNL is that the first choice in the sequence is no loss, as achieved by avoidance, then mitigation as the second choice.

be noted that views on the context and application of NNL as a policy concept varied widely with several useful suggestions. For example, some view NNL as an ideal which at best, is seldom achieved in practice. Others believe the concept should form the core of wetland conservation policy, while some believe it is not a workable concept. Most respondents suggested the concept has merit embedded in a more variable approach involving other policy options or consultative actions which can be tailored to suit the unique circumstances of each situation. On balance, more respondents favoured the NNL concept, although several people have had problems with this approach. It was pointed out that there are growing pains associated with NNL as practitioners learn to create, restore and enhance habitat.

Comments by respondents include:

- NNL has to be based on measurable components, but where the values of many functions like societal values are difficult to establish, how is NNL to be achieved?;
- NNL should apply on-site through mitigation or at least in the same watershed or ecosystem through compensatory measures;
- NNL pertains to preserving wetland functions and values and should consider factors such as wetland quality and uniqueness;
- NNL has to be reasonable or it would be too difficult and costly for governments to sustain;
- wetland potential has to be a consideration — are some more valuable and amenable to restoration or rehabilitation?;
- awareness and articulation of hidden values is needed — i.e. intrinsic, ecological integrity;
- flexibility has to be built into the NNL policy or it could turn out to be as rigid as NL;
- NNL through mitigation and compensation is not reliable because the knowledge and monitoring are not there — put the emphasis on avoidance and "risk reduction";
- the temporal aspects of losses (temporary or permanent) should be considered in the policy;
- NNL should go beyond the functional level and consider factors such as diversity, variability in species, mosaics of growth and temporal implications. Losses in species richness are not acceptable but short-term losses in abundance are not a major issue;
- in an ideal world all things would be managed on an ecosystem basis with NNL driving the policy and applied on an ecosystem basis;
- considering how vulnerable NNL is from a scientific viewpoint, how should we proceed?;
- some respondents felt that NNL in the fish habitat policy does not work — it is always a trade-off between commercial and non-commercial species with the latter being consistent losers;
- NNL in the fish habitat policy applies only to target species, not ecosystems;
- achieving NNL depends on where losses occur and available technology. It is difficult to replace a wetland which has taken hundreds or thousands of years to form;
- the practical implications of NNL should be considered; and
- NNL should include a landscape potential component.

B. Mitigation

A focus of mitigation is prevention, which is crucial in conserving wetlands. To be effective, consistent mitigation guidelines, procedures and standards are required at a broad, national level stepping down to more specific guidelines at a regional level and in each sector. Some detailed guidelines for activities within sectors have been developed by industry and government, and are being widely applied in progressive industries as a component of normal operating procedures. More work is needed to refine guidelines and develop innovative mitigation technology. Sector and resource specific guidelines are needed, but these are beyond the scope of this paper. Incentives are also required to encourage the adoption and use of mitigative technologies in industry and government, and among private landowners.

To be effective, consistent mitigation guidelines, procedures and standards are required at national, regional and sectoral levels.

There is a need for quick and effective mitigation measures that are based on science, but are also defensible from an environmental, social, economic and political viewpoint. Although the science and technologies may not yet be well developed, actions must still take place; mitigation techniques will improve over time as a knowledge of what works and what does not work is acquired. However, for this to occur, research and monitoring of mitigation technologies is required. An adaptive resource management approach should be taken to improve knowledge and effectiveness of mitigation measures over time (see discussion in compensation section).

Comments by respondents include:

- mitigation standards and procedures should be used as guidelines — there is too much variability in nature and on a site-by-site basis for hard and fast rules;
- mitigation is a cost of doing business;
- mitigation has a major role in preventing cumulative impacts;
- buffer zones around wetlands and watercourses, stream crossing technologies, erosion control methods in uplands, sedimentation abatement, and particular care with respect to small drainages and feeder creeks are the principal approaches to wetland mitigation by natural resource industries;
- mitigation should apply through the life of the project. Mitigative measures break down over time and changing environmental conditions. This often happens long after the proponent has any use for or interest in the project;
- mitigation guidelines should not be rigid to the extent that they stifle creativity — innovation is a key requirement in mitigation approaches;
- mitigation is not about preventing natural succession from proceeding (enhancement often involves alterations of succession). Mitigation needs to ensure natural processes continue; and
- the suggestion that project effects occurring within the normal range of environmental variation needs qualification from several viewpoints. Projects may alter the spatial-temporal distribution

of habitat components quite significantly without falling outside the natural range of variability — how secure is this approach?

C. Compensation

There is very little Canadian experience in wetland compensation, although there are several indications that compensation will become an important component of wetland conservation policies and strategies in the future.

In Atlantic Canada, a decision has been made to build a portion of the Trans-Canada Highway through the Grand Lakes Meadows (GLM) wetland at the junction of Jemseg and the St. John River. The wetland is a site of regional, national and international significance and was one of the original First Step projects under the North American Waterfowl Management Plan (NAWMP). This is the first time Plan partners have faced the prospect of a major development project occurring on a NAWMP site. The *Wetland Mitigation and Compensation Project* was initiated partly in response to issues, needs and questions raised with respect to establishing a compensation agreement for the GLM wetland. It became apparent that principles and guidelines for approaching situations involving wetland compensation were insufficient in Canada and would be required in the future.

Elsewhere, compensation issues have been raised and resolved with respect to wetlands, including the creation of a parallel runway at the Vancouver International Airport, the building of the Confederation Bridge between New Brunswick and Prince Edward Island, and on a smaller scale in other locations. The Province of Quebec has gained some experience in wetland compensation through the negotiation of compromises between agriculture, municipal and wildlife interests. In Ontario, wetland losses occurring under the no loss policy have not been compensated. A more flexible approach to the application of the NL policy is being attempted in a few locations by exploring compensation options.

The majority of Canadian knowledge and experience in compensation issues lies in the area of fisheries habitat management. The NNL and NG provisions of the federal *Policy for the Management of Fish Habitat* have required proponents to undertake measures to compensate losses of fish habitat. However, fish habitat compensation rarely includes financial compensation.

Most respondents feel strongly that compensation is a last resort. It should be applied only after all other options have been exhausted.

While experience in wetland compensation in Canada is limited, there is no shortage of interest and opinion on the topic. Most respondents feel strongly that wetland compensation is a last resort. It should be applied only after all other options in the sequence suggested earlier have been exhausted. Compensation is portrayed by many as a failure of sustainable development, and hard opinions quickly emerge on the administration, ethics and use of funds derived through compensation. Nevertheless, most respondents feel compensation should be

considered as an option in certain situations. It was a goal of the *Wetland Mitigation and Compensation Project* and the National Workshop on Wetland Mitigation and Compensation to provide guidance on the issue.

The most prevalent comment by those interviewed emphasized the widespread lack of experience in wetland compensation. However, there was no difficulty in coming up with suggestions about what should be done, although many suggestions were contradictory. Some felt that compensation requires a philosophical underpinning — who should be compensated for wetlands, wildlife and other common property resources? Others felt it was more of a science issue: compensation has to be based on science — science must take the lead on this, not perceptions and attitudes — science is the common currency.

There are some things that cannot be compensated for: how do we choose when to allow compensation or not? How is "unavoidable" defined? Specific criteria are needed to describe when compensation is not to be used. How does one determine the right amount of compensation?

A learning approach to compensation issues is needed: we need to create a framework to learn through experience and experimentation. Although it may be difficult to support compensation for wetland habitat, given the lack of information and experience, we should not be paralysed into inaction through fear of failure. The Adaptive Resource Management (ARM) paradigm developed in the United States has tremendous potential application in building the scientific and practical knowledge base for wetland compensation. The adaptive approach is a learning framework designed to reduce ecosystem uncertainty with respect to management options and to improve management performance. ARM is based on a feedback loop consisting of management decisions, monitoring outcomes and assessment. The ARM paradigm forces managers to set management objectives at the outset and to consider the estimated value of information before a decision to pay for obtaining the information is made.

Although it may be difficult to support compensation for wetland habitat, given the lack of information and experience, we should not be paralyzed into inaction through fear of failure.

Comments by respondents include:

- the levels and amounts of compensation should be established on a project-by-project basis, not through a broad policy directive;
- how should small impacts over a large area be compensated? For example, highway construction may cross several streams or impact a number of small wetlands. In situations where it is not practical or perhaps even possible to mitigate each potential impact, how should these cumulative effects be compensated?;
- use the variety of regulatory/policy systems already in place. There is adequate protection, it just is not applied;

- where do mitigation/compensation provisions already exist in regulatory tools and policies across Canada? There is a need for a background review of all relevant tools to determine what elements encourage mitigation and compensation;
- policies, including provision for compensation, should not be designed by bureaucrats as a form of "entrepreneurial government" for wildlife programs which currently lack financial resources; governments are charged with representing the public interest in wetlands and natural resource stewardship, not with the business of generating revenues for conservation;
- policies should not be used for corporate "greening" of companies with poor environmental records and images;
- companies and governments have a tendency to go straight to compensation rather than deal with potential impacts in the design stage or through avoidance. Some major developers would rather write off habitat functions for a cash settlement or "add on" technology to solve problems. For example, a utility may propose building a fish hatchery rather than mitigating the loss of spawning habitat resulting from a development project. It is often in the company's best interest to find a quick solution, sever off some money and proceed. These quick-fix approaches are sometimes appealing to bureaucrats because they are easier and less confrontational. It is difficult for bureaucrats to support the public interest when politicians and industry clearly want to proceed;
- the *Public Land Act* of 1905 in Alberta indicates that the land under wetlands is publicly owned; the same history occurs in Manitoba and Saskatchewan. Why compensate farmers for wetlands that are public lands under this Act?;
- there needs to be a clear distinction between public and private land with respect to policy and compensation;
- several concerns relating to the use of enhancement technologies in wetland compensation include:
  - it often targets species that are not the same as those affected by project; it often sets back natural succession; it targets species not ecosystems; and it can be detrimental to non-target species, habitats and other values;
- compensation should be designed with environmental variability in mind; it should have at least as much resilience to adapt to environmental change as the habitat it replaces;
- the monitoring of compensation/mitigation must be transparent and accessible to the public;
- policies involving compensation will be challenged from within and outside of government;
- there are two methods of valuing compensation: by the cost of physical replacement, assuming it is possible, and by market value which may have application in an urban environment. For example, if a developer pays $10 million for an area that is one third wetland and destroys it, it would cost him/her $3 million as a cost of doing business;
- if compensation is prohibitively high, it will serve as a deterrent;
- the landowner should be compensated to get what we want — he or she damages the habitat and environmental interests pay him/her for improvements;
- compensation does not have to involve an exchange of dollars — the proponent can fulfil all compensation requirements and pay for it without governments or anyone else touching the money; and
- practicality and cost effectiveness are components of reasonableness and must be preserved — the question is how to break out these components in making decisions.

D. Mitigation Banking

Mitigation banking is the setting aside of money and/or created wetlands to be used in exchange for wetland values and/or area lost through development. Few respondents were familiar with the concept. Initial reaction suggested that a system of straight cash compensation for wetland losses would entail several risks. The fear is based on the potential ease that such an arrangement could be established and maintained, coupled with the capability of generating large amounts of money. Industry could by-pass functional assessments and time consuming processes, and busy government managers may find mitigation banking to be an easy, financially rewarding approach.

On the other hand, some potential benefits of an ethical and well-managed mitigation banking concept were recognized. Mitigation banking could increase flexibility under a policy with provisions for compensation. Funds could be set aside to purchase valuable pieces of critical habitat or to build corridors of contiguous habitat for species in fragmented environments, rather than continue to preserve isolated chunks.

Habitat exchange is a form of mitigation banking or negotiation. The concern with exchanges is the overall loss of habitat that could result. Exchange and mitigation compensation may not apply to all habitats, but could be a useful option to explore for increasing the flexibility, innovation level and effectiveness of compensatory approaches.

VALUES, PROCEDURAL ISSUES AND ETHICS

At the core of wetland conservation is the central issue of determining values of wetland functions and resources. It is critical to establish the nature of these values as the common ground for conservation approaches.

At the core of all approaches to wetland conservation, whether it is compensation under a NNL policy or building public support through awareness, is the central issue of determining values of wetland functions and resources. Whether values of wetland functions are presented in hard financial terms, or perceived as an essential ecosystem component supporting derived benefits such as agricultural products, flood control, quality water or wildlife, it is critical to establish the nature of these values as the common ground for conservation approaches. It is evident through the Canadian experience that establishing a simple understanding among governments, industry, communities and landowners of why wetlands are important is the starting point for conservation.

Most procedural comments related to awareness or ethics. Business has to be aware of rules and policies and how they apply. The prospect of policies containing provision for financial compensation or mitigation banking raises several ethical questions about the administration of financial resources. Any system needs equity, fairness and consistency from all perspectives. Achieving these goals in an effective and efficient approach to wetland conservation through mitigation and compensation will

require a clear set of procedures which are transparent to all, and an application that has sufficiently considered the full array of ethical questions raised from all sectors and interests.

At the centre of win-lose experiences is the concept of using dollars as the only value yardstick for making land use decisions. This approach engenders competing economic value scenarios, disputes over figures and accusations of false economies on all sides. Experience shows that economic and environmental benefits and opportunities provide an array of social needs, and that the actions taken on the land, at whatever scale and for whatever purpose, always affect Society in some way. Sustainable strategies for all interests and sectors will recognize that environmental and economic well-being are not fundamentally at odds, or even separable in reality. A win-win approach is founded on the understanding that Society needs both economic and environmental benefits, not one or the other.

Pressures to maintain environmental, economic and social sustainability in land use decisions will encourage compromises between individual and collective interests in the long run. Single purpose agendas, whether they are for wildlife, agriculture or industrial development, will have an increasingly difficult time operating in isolation from the rest of the world, as social, economic and environmental pressures mount. Awareness at all levels of the full array of ecosystem and resource values at stake in policies, regulations and other decisions on land use is the common ground for negotiating the compromises required.

Comments by respondents include:

A. Values

- establishing economic figures for the full range of wetland functions and resources is the biggest challenge in determining what to ask for in compensation;
- the problem of establishing values originates in the difficulty of describing and accurately portraying natural wealth and to whom the benefits accrue;
- the concept of potential value of wetland functions should be a consideration in any valuation process. Ecosystems are subject to change over longer periods of time than is normally considered in planning and development processes. Ecosystems have a wide range of variability, having evolved to cope with major changes through ecological time, such as periods of drought and high moisture. These cycles cause fundamental changes in landscape productivity and potential to support wildlife and other resources. Populations of fish and wildlife living in a variable environment change dramatically in abundance over time. Ecosystem dynamics and the knowledge of how ecosystem variability affects resource values are key in establishing potential value. Value systems derived through inventory approaches to environmental assessments should be tempered by a knowledge of ecosystem dynamics;
- there is a lack of field expertise and experience in government to evaluate projects and determine wetland functions and values;

- any landowner can go to court and challenge the recommendations of consultants or officials with respect to values — the fear of challenge may become an obstacle to compensation policy;
- the functional analysis of wetlands creates the bridge or linkage between economic and outdoor recreation values — proponents are much more receptive to mitigation or compensation measures when they understand the functional values these measures are aimed at conserving. It is key that other people understand the values involved. The descriptions of functionality were a big help in building this bridge of understanding on the Grand Lake Meadows project;
- wetland and ecosystem values should be broadcast more widely — we are not getting the message out to landowners, governments, industry and the general public;
- enhancement often replaces one set of values with another; and
- the approach to land use and the value system apparent in agricultural agencies and interest groups is largely single purpose in scope. The inherent assumption is that agriculture is of primary importance and that non-agricultural values are peripheral, having their rightful place in the residual capacity of the landscape. There is also an assumption that landowners agree with this limited perspective on landscape values.

B. Procedural Issues

- there should be a system in place to resolve differences of opinion and conflicts among stakeholders;
- business and industry need to know how the values of functions and resources are established. Business needs access to the procedures, technology and the decision-making framework and criteria. For example, if a developer knew how a value system would be applied and quantified for a wetland environment in a river system, it would be easier to make decisions that would avoid costly problems. There should be an accepted system in place which is non-arbitrary and takes the mystery out of the process;
- policy applications should be consistent with the way of doing business in communities. The thinking and interpretation of policy should be accessible to the developer and associated costs or actions required rolled into the cost of doing business in ways that the developer understands and can achieve; and
- the real costs of environmental assessments should be paid by proponents, not the taxpayer. In Canada, there is a tradition of government supporting development projects to the extent that significant assessment costs and services are provided to the proponents free of charge.

C. Ethics

- the ethics of the environmental assessment industry could be enhanced in some areas. There is a tradition of providing favourable assessments on behalf of proponents in some parts of the industry. A code of conduct with monitoring compliance is needed;
- policies and procedures should ensure that the easiest and most efficient route to approval for development of wetlands is not a financial transaction. The perception of buy-out or sell-out with respect to compensation policies and strategies is highly volatile and contentious;

- the public interest vested in government is a concern for species and habitats, not the development of financial resources for wetland programs;
- how far should governments go in offering to exchange the fast-tracking of environmental approvals for money?;
- several government departments are in fundamental conflict of interest with respect to environmental issues. Governments are often the development proponent and the defender of the public interest in the environment and resources, on the same project. Conflicts of interest are apparent up to the Ministerial level in some cases;
- government frequently dodges responsibility for decision-making and action on issues. It was felt by some respondents that the federal and provincial governments do not enforce their own regulations when it is not in their interests, resulting in one law for industry and another for government. It is difficult to get government to the table if any form of financial responsibility may result, but easy to get them there when industry money is on the table. Political considerations ultimately prevail, which appears as a fundamental conflict of interest in the system;
- administration of funding derived through compensation settlements should always be through third parties, and not be accessible to government. Local stakeholders should have a role in determining the uses of these funds;
- the focus must remain on conservation, not money;
- mitigation banking could be dangerous; clear rules are needed up front to ensure the purpose remains conservation, not fundraising by governments and NGOs; and
- compromises may require or result in trade-offs in some functions/values. Cross-functional trade-offs are more easily handled in circumstances where objectives exist in a habitat or resource management plan.

ROLE OF LEGISLATION

Environmental legislation plays a role in wetland conservation under various acts and regulations across Canada. Federal and provincial environmental assessment acts, water resources acts, clean water acts and several others provide a measure of protection to wetlands, usually without precise reference to or the use of the word "wetland". In general, this protection is scattered and for most wetland situations across the country, it is virtually non-existent. In most cases, the protection afforded through regulations tends to apply only to very large wetlands on a provincial level, or to very large projects that have federal financing.

There is great reluctance on the part of government at federal and provincial levels to enforce available legislation pertaining to wetlands. In many provinces, wetlands must be in the order of 10 to 40 acres in size before they are considered under regulation. These size criteria exclude most of the small, incremental and cumulative wetland losses in Canada from regulatory protection. On the other hand, the government is often a proponent or partner in large projects, creating a conflict of interest with regulatory functions, and an awkward working environment for conservation administrators.

Several respondents suggested that there is adequate protection for wetlands under various acts, but the reluctance of administrators to enforce regulations rendered the available protection ineffective. The interviews imparted a strong sense that regulations directed at private landowners would not be a useful option in jurisdictions where there is a traditional "hands-off" approach to activities of landowners on their property.

In spite of the traditions and difficulties outlined above, most respondents felt that regulations have a role in wetland conservation. Policy and legislation such as the *Fisheries Act* and the *Policy for the Management of Fish Habitat* have been extremely successful in focusing attention on fish habitat and promoting mitigation and compensation. A principal benefit of the *Fisheries Act* and the *Policy* has been the awareness of the requirement to consider and protect fish habitat by governments, industry and individuals.

Several respondents suggested that there is adequate protection for wetlands under various acts, but the reluctance of administrators to enforce regulations rendered the available protection ineffective.

Industry respondents outlined the requirement for clarity, consistency, flexibility and reason in the application of regulations and supported some kind of rules and guidelines to be put in place that would apply to all parties, including governments. It was clear from the interviews that a balance between policies and regulations, incentives and deterrents would result in the best mix of actions and strategies for wetland conservation.

There has been a trend toward consolidating several pieces of provincial land use and environmental legislation under environmental acts across the country. This trend has been viewed positively by proponents of ecosystem management approaches because getting the various agencies in government together is a first step toward integrating land use policies and decision frameworks.

Comments by respondents include:

- the separation of fish and wildlife in tradition and legislation is an impediment to ecosystem management;
- private groups are more proactive with the threat of legislation;
- avoid the negative impacts of harsh legislation;
- a legislative focus may only protect one component of the ecosystem, i.e. wetland with nothing in between;
- need legislation to deal with governments and other government departments;
- no legislation for municipalities and landowners;
- need legislation to at least get agencies and organizations together;
- the manager/regulator needs specific guidelines backed by science;
- it is hard to create incentives without regulations;
- policy should be balanced with regulations; and

- compare the success of a particular model built on compromise with less than 100 percent protection with a regulatory model like no loss. No loss gets chipped away. You spend two to three years putting it in place and the rest of your life defending it. Compromise is similar to democracy. It is not perfect, but it is built on a win-win approach that will deliver more wetland conservation in the long run.

ROLE OF NON-POLICY CONCEPTS

In Canada, approximately 70 percent of the surface area of the nation has specific federal or provincial wetland policy or legislation relating to it. However, six provincial jurisdictions do not have specific policy on wetlands, although policy development is underway or planned in two of these jurisdictions. While the federal wetland policy applies on most lands in the Yukon and Northwest Territories, it has not been extensively used in land use decision processes because few wetland impacts have been identified in federal environmental assessments to date. Wetland issues in provinces without policies are considered on an ad hoc basis under varied legislation, or through some of the concepts to follow.

Federal and provincial governments have developed experiences and approaches to wetland development issues and situations which have worked successfully in the absence of specific wetland policy direction. These approaches have a useful role in the tool kit of options available to conservationists in the public and private sector and could be considered as "stand alone" options, or usefully combined with legislative and policy concepts.

A. Participatory-Consultative Approach

The participatory-consultative approach (PCA) is fundamental to any conservation initiative whether it is undertaken at a community or national level. PCA is based on awareness, consultation and agreement among all parties and assumes that all stakeholders have a role in arriving at a mutually acceptable, negotiated solution.

The participatory-consultative approach is fundamental to any conservation initiative undertaken at a community or national level.

PCA may be used in a policy context and/or to meet the mandate requirements of an agency under legislation. The approach uses the best scientific information and experience available to strive for a harmonized solution, as opposed to specifying trade-offs under NNL.

PCA was used to negotiate the mitigation/compensation package developed for the parallel runway project at the Vancouver International Airport. It has also been used as an experience-based approach to dealing with other interests in other provinces.

Early dialogue with a potential developer sets up a process aimed at gathering the database needed to guide decisions. As a rule of thumb, there is no discussion of compensation up front. The project is assessed in terms of avoidance in the early stages and the potential to mitigate impacts on site.

A project advisory panel comprised of government(s), the proponent and other stakeholders is set up. The panel is asked to consider a variety of tools and to think about how to apply them or create others to achieve conservation or NNL objectives. A mixture of approaches and tools such as money for acquisition, restoration and innovative ways of looking at stewardship may result.

PCA works by building dialogue and relationships among the principal players and stakeholders in the process along the way. The participants gain awareness of the functional values of wetlands. These are used to build the bridge between economic and ecological values, which supports the tangible need for conservation. Participants face the procedural and decision-making process jointly and gain an appreciation of the opportunities and constraints of the others in a cooperative environment.

The onus is placed on the proponents to implement the avoidance, mitigation and compensation measures recommended by the panel. In an ideal arrangement, the proponent would fulfill the terms of the agreement without any transfer of funds to other parties.

Participants from the provinces and other government departments may be consistently involved in a number of issues, creating a foundation for cooperation and understanding which grows with experience. Team members become the core of a highly valued network of expertise and experience.

PCA partnerships also add value when the decision-making process is challenged within and outside government. Because PCA is a mutually-acceptable, harmonized solution, it provides credibility and a higher level of confidence in the outcome. The PCA creates an enduring network of expertise and a transferable array of benefits derived through experience that can be applied in the future.

B. Planning

Planning emerged in the interview process as a proactive option for wetland conservation. In cases where wetland policy exists, planning is a necessary companion to achieving policy goals. A key benefit of planning is in the communication of ecosystem concepts, functions and values to other government departments. In the absence of wetland policy, landscape planning processes can provide an official vehicle for linking related policy directives, such as wildlife policy and supportive policy from other levels of government, including legislation where available, in an overall approach to wetland conservation.

Planning emerged in the interview process as a proactive option for wetland conservation.

Planning is most valuable when it is backed by inventories outlining the distribution and relative value of wetland habitats within a jurisdiction. The inventory tool allows individual projects to be assessed in terms of how the development will impact the overall abundance and distribution of wetland classes. GIS planning tools can integrate land uses and provide direction to development strategies and projects.

The objective setting process in planning helps decision-making in several ways. Ecological objectives address issues of ecological integrity and continuity in habitat components up front. These provide a background and in some cases, a measure of justification within the planning system for decisions related to conservation. The principal advantage of ecosystem planning is in creating awareness within and among government departments of ecosystem values and an accepted procedural framework for considering these values in the face of competing land uses.

Species management plans can also assist in making decisions on compensation. Certain species and their habitats may be relatively much more abundant than others within an ecozone or jurisdiction. Compensation measures could be focused on priority habitats or species within a watershed or ecosystem when the option to compensate losses off-site is exercised. In these cases management plan objectives point to ecosystem priorities and provide an approved framework within the system for exercising options where they are most required.

Mitigating cumulative impacts raises a unique challenge to wetland conservation. The spatial-temporal distribution of small-scale losses diminishes the cost effectiveness of mitigation and makes demands to rectify these losses appear unreasonable. However, small-scale, cumulative losses continue to be the most important factor eroding ecosystem capability across the country. Planning creates a framework and tools for assessing the overall impacts of smaller losses of wetland capacity within a jurisdiction and is a first step in finding solutions.

The compromises and trade-offs prevalent in mitigation/compensation measures call for a basic understanding of the ecosystem processes and values up front. Conservation measures have been most successful when they are guided by planning and inventory tools established in advance of development events.

C. Statements of Interest

Wetland policies are often perceived as an impediment to economic development, or to the interests of other government departments. However, in many instances a strong case has been made that wetland conservation results in significant economic benefits to private and Crown landowners. A major benefit of policy is the awareness it creates in the public and private sector. Innovative methods of communicating wetland functions and values to the public, industry and other government departments are required where wetland policy is not an option.

The Nova Scotia government has recently reviewed legislation affecting municipalities and is proposing a new Act that consolidates the myriad of statutory provisions relating to local government. The new Act provides for "Statements of Provincial Interest" which recognize the importance of land and water resources, are supportive of the principles of sustainable development, and are intended to help provincial government departments, municipalities and individuals make decisions regarding their use. Statements are general in nature, providing guidance rather than rigid standards. They reflect the diversity found in the province, and do not take into account all local situations. They must be applied with common sense. The activities of the province and municipal planning documents should be reasonably consistent with the statements. Wetlands are a resource expected to have a Statement of Provincial Interest.

D. Incentives

Incentives have been widely used to encourage wetland conservation in Canada through programs such as the North American Waterfowl Management Plan. A detailed review of conservation incentives is beyond the scope of this project, but incentives arise in most discussions and are a key element of conservation policy and programs. Economic, tax and market incentives have direct application because they encourage wetland mitigation and compensation. Incentives provide a basis for alternative approaches to wetland conservation that could be considered by governments and private conservation organizations.

Incentives have been widely used to encourage wetland conservation in Canada through programs such as the North American Waterfowl Management Plan.

Economic incentives to landowners include payments or services rendered to landowners in exchange for agreements to preserve wetlands and frequently, some associated upland habitat on their property. Economic incentives can be cast as an alternative or complementary option to wetland policy, particularly on the Prairies where there is a reluctance to apply policies to private landowners.

Tax incentives include assessment of wetland property at lower rates than agricultural land and income tax benefits (ecological gifts) through the charitable donation of title, easements or covenants relating to wetlands to conservation groups. Interest in tax incentives to conserve valuable habitats has been increasing at the federal level and are in a controversial transition stage in several provinces. Tax incentives may offer an alternative or companion to wetland policy. In fact, all industry interviewed felt that legislation is needed to balance market incentives.

Market incentives are becoming more common in resource industries. Market incentives are driven by consumer preferences for products derived through environmentally sustainable business practices. These incentives can encourage industry to mitigate or compensate wetland losses or impacts which result from business operations. For example, certification of forest industries using the best environmental management practices has resulted in consumer pressure in international

markets. Certification is related directly to market access and price, making it a powerful incentive to implement environmental guidelines. However, consumer-driven market incentives supporting environmental conservation appear more prevalent and popular outside of Canada.

The record of environmental performance is important for international business opportunities and can be an incentive to develop environmental policies and best management practices. Development agencies such as the World Bank check the environmental record of companies, as do many developing nations. Loss of economic development opportunities and access to markets are incentives to environmental responsibility in the global marketplace.

In Canada, in order to support consumer preferences for sustainable products there should be a means of distinguishing products from environmentally-friendly producers (in addition to the Ecologo). This would identify products resulting from firms using the best environmental management practices. However, there is some sense that public or market-driven incentives based on profitability are better drivers than "green" appearances.

As previously stated, the purpose of this document is to give an overview of key concepts, reactions from across the country and perceptions raised during the interview process. In its condensed form, it hopefully presents considerable background for future discussion concerning mitigation and compensation.

LIST OF INTERVIEWEES*

Government:

- Department of Fisheries and Oceans, Canada
- Environment Canada, Biodiversity Convention Office
- Environment Canada, Canadian Environmental Assessment Agency
- Environment Canada, Canadian Wildlife Service
- Environment Canada, Environmental Conservation Branch
- National Capital Commission
- Alberta Department of Natural Resources (Fisheries Management)
- British Columbia Ministry of Environment, Lands and Parks
- Manitoba Department of Natural Resources (Fisheries)
- Manitoba Department of Natural Resources (Policy Branch)
- New Brunswick Department of Natural Resources and Energy (Fish and Wildlife Branch)
- Northwest Territories Department of Resources, Wildlife and Economic Development
- Nova Scotia Department of Natural Resources (Wildlife Division)

** A total of 62 people were interviewed, including at least one from each of the organizations and government departments listed.*

- Prince Edward Island Department of Environmental Resources (Fish and Wildlife Branch)
- Prince Edward Island Department of Environmental Resources (Water)
- Quebec Ministère de l'Environnement et de la Faune
- Saskatchewan Department of Environment and Resource Management (Fish and Wildlife)
- Yukon Department of Renewable Resources (Fisheries)

Industry:

- Canadian Environment Industry Association
- Canadian Pulp and Paper Association
- Gulf Canada
- Inco Ltd.
- J.D. Irving Limited
- Noranda
- Placer Dome Canada Ltd.
- REPAP
- Shell Canada

Other Organizations:

- BC Hydro
- Delta Waterfowl Foundation
- Ducks Unlimited Canada
- Hydro Quebec
- Manitoba Habitat Heritage Corporation
- Manitoba Hydro
- Ontario Hydro
- Prairie Farm Rehabilitation Commission
- Saskatchewan Wetland Conservation Corporation
- Wetlands International — The Americas
- Wildlife Habitat Canada

A BRIEF OVERVIEW OF U.S. EXPERIENCE WITH WETLAND COMPENSATION AND MITIGATION BANKING

Kevin K. Loftus and W. Dan Mansell
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INTRODUCTION

In the fall of 1996, the North American Wetlands Conservation Council (Canada) (NAWCC) concluded that a national workshop was needed to:

- examine experience with and attitudes towards wetland mitigation and compensation in Canada;
- critically assess the potential value of compensation as a compensation/regulatory tool; and
- begin developing guidelines for the use of compensation in Canada, in the event that it is concluded that compensation has promise as a conservation/regulatory tool.

In recognition of the fact that there is a wide range of experience with, and knowledge of, wetland mitigation and compensation issues amongst those involved in the management of wetlands across Canada, it also was concluded that two brief reviews should be prepared as a means of providing all workshop participants with a common point of reference.

The first review, reported in Bailey 1997, is aimed at assessing the views and experiences of federal, provincial and territorial governments, industry and national non-government organizations across Canada on wetland conservation through mitigation and compensation. The review recognizes that the majority of experience within Canada with compensation had been with fisheries habitat issues. Accordingly, experts in this area were also interviewed.

The second review, which is the subject of this paper, is intended to summarize U.S. experience with wetland compensation and/or mitigation banking. This review was deemed to be important because the U.S. has several decades of experience with wetland compensation. As Canadians, there is much we can and should learn from this experience.

This review is not intended to be comprehensive. Rather, it is intended to address a series of related questions. What is the nature of the U.S. experience with wetland compensation and mitigation (compensation) banking? Has it been a success? If so, why? If not, why not? In dealing with these questions, it is hoped that workshop participants will be in a better position to determine the potential advantages and disadvantages of compensation as a conservation/regulatory tool, and to develop appropriate guidelines for its application in Canada.

The review that follows is based upon four primary sources of information: (1) literature; (2) interviews with a number of U.S. experts; (3) presentations given and discussions[1] held at the Temperate Wetland Restoration Workshop held in late 1995 in Barrie, Ontario; and (4) personal communications with several U.S. experts during the past 18 months.

DEFINITIONS

There are some differences in the use of terminology between Canada and the U.S. Some terms, such as mitigation banking, have application in the U.S. but have no clear parallel in Canada. The following definitions are provided to assist readers in interpreting the review text that follows.

Canadian Terminology

The authors propose the following definitions for mitigation and compensation, since they are consistent with the use of the terms in the federal *Fisheries Act.*

Mitigation: *Actions taken to prevent and/or minimize the negative impacts of an undertaking on wetland functions and/or area.*

Compensation: *Actions taken at another location to offset the negative impacts of an undertaking on the functions and/or area of a particular wetland, where such impacts can not, or will not, be mitigated.*

U.S. Terminology

In much of the U.S. literature, there is overlap between the definitions of mitigation and compensation. Specifically, compensation is usually considered as a type of mitigation.

Mitigation: as defined by the U.S. Council of Environmental Quality, as cited by Marsh *et al.* (1996), includes: (1) *avoiding the impact altogether by not taking a certain action;* (2) *minimizing impacts by limiting the degree of the action;* (3) *rectifying the impact by repairing, rehabilitating or restoring the affected environment;* (4) *reducing or eliminating the impact over time by preservation and maintenance operations; and* (5) *compensating for the impact by replacing or providing substitute resources.*

In essence, mitigation, as defined above, includes elements of both mitigation and compensation. It further identifies restoration, rehabilitation and creation as mitigation tools, none of which are normally considered mitigation tools in the Canadian lexicon.

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[1] *An informal policy discussion was held during the Temperate Wetland Restoration Workshop. The discussion focused on mitigation banking and compensation in the U.S., and the reasons for its success or failure. The session was attended by roughly 15 U.S. experts (including representatives of the U.S. Army Corps of Engineers, U.S. EPA, state representatives, NGO representatives, academics and consultants) and 10 Canadians.*

Compensation: The term is not explicitly defined by the U.S. Council of Environmental Quality, except insofar as it is described as item (5) in the definition of mitigation, above.

Mitigation Banking: refers to *the creation, restoration or enhancement of wetlands that will be sold or exchanged to compensate for future wetland losses. Typically, the created, restored or enhanced wetlands are designated as a bank. The value of the wetlands created, restored or enhanced are somehow quantified and assigned credits, which can be sold or "withdrawn" to compensate for losses elsewhere* (Marsh *et al.* 1996).

According to the above definition, "mitigation banking" would be more appropriately termed "compensation banking" in the Canadian lexicon.

In the text that follows, the use of the words "mitigation" and "compensation" will follow their normal use in Canada, and the term "mitigation banking" will be referred to as "mitigation (compensation) banking" to remind readers of the Canadian meaning of the term.

Three other terms are defined according to Lewis (1990), because they often mean different things to different people.

Restoration: *Returned from a disturbed or totally altered condition to a previously existing natural or altered condition by some action of man. Restoration refers to a return to pre-existing conditions.*

Creation: *The conversion of a persistent non-wetland area into a wetland through some activity of man. This definition assumes that the site has not been a wetland within recent times (100 to 200 years).*

Enhancement: *The increase in one or more values of all or a portion of an existing wetland by man's activities, often with the accompanying decline in other wetland values.*

WETLAND COMPENSATION IN THE U.S.

There are two broad situations in the U.S. where wetland compensation is undertaken:

1. where compensation is required through a regulatory process when a proponent wishing to develop in a wetland must first obtain a permit under Section 404 of the *Clean Water Act*. In these situations, compensation can be achieved either through the use of a mitigation bank, or by directly creating or restoring wetlands.

2. to compensate for historical, previously-uncompensated wetland losses. The projects are undertaken on a voluntary basis by government, non-government and other groups. Because these projects are not undertaken as part of a development proposal, they do not require Section 404 approvals.

The degree of success attributed to wetland compensation (mitigation) projects has been highly variable[2] across the U.S., and there have probably been more failures than successes. Despite the fact that so many compensation projects have failed, and some continue to fail, there is reason to be optimistic. The failure rate has been declining in recent years as many of the reasons for failure are being addressed. There is also a growing consensus among those involved in the conservation of wetlands that the science of wetland creation and restoration, though imperfect, is well-enough developed for *some types of wetlands in some settings* that failures should be relatively uncommon, provided that existing technologies are properly applied and that the limits to these technologies are recognized. This view has been expressed in personal communications with a number of highly-respected wetland experts[3] in the U.S., in Canada and in the literature (e.g., Kusler and Kentula 1990; Salvesen 1990). Despite this, there remain some important science gaps which, once addressed, should lead to further improvements in the success rates associated with a wide variety of wetland compensation projects. These gaps, along with a description of the status of the science, are provided for a variety of wetland types and situations in 15 different papers contained in Kusler and Kentula (1990).

MITIGATION (COMPENSATION) BANKING

Mitigation banking first developed in the U.S. in the 1970s due to a need to develop a mechanism to mitigate (compensate for) the loss of wetlands caused by development projects, as required by the *Clean Water Act* of 1972. Prior to this time, developers had neither the expertise nor the incentive to mitigate (compensate for) the impacts of their projects on wetlands. The premise behind mitigation (compensation) banking is that, using a market approach, a "mitigation banker" could create, restore or enhance wetlands to create a bank of wetland credits that could be sold or conveyed to another party who would utilize the credits to compensate for the adverse impacts to other wetlands caused by one or more developments. The "mitigation banker" could be a third party, a developer, or a consortium of developers (Marsh *et al.* 1996).

While few would consider mitigation banking to have been highly successful to date, many would argue that it has the potential to play a significant and positive role in the protection of wetlands.

While few would consider mitigation (compensation) banking to have been highly successful to date, many would argue that mitigation banks have the potential to play a significant and positive role in the protection of wetlands (Albrecht and Wenzel 1996; Brumbaugh 1997; EPA 1995b;

[2] *This statement applies to created and/or restored wetlands that have been designed to compensate for natural wetland losses. It should be noted that the degree of success of wetlands constructed for other purpose (e.g., wastewater treatment) is also variable. Excellent sources of current information on the construction of wetlands for wastewater treatment are provided in Hammer (1989), Moshiri (1993) and Kadlec and Knight (1996).*

[3] *U.S. experts contacted include Kevin Erwin, Mary Kentula, John Kiertscher, Mark Kraus, Jon Kusler, Mary Landin, Robin Lewis, Joseph Shisler and Alan Wentz. Canadian experts include Ducks Unlimited Canada personnel (Ted Gadowski, Ron Maher and others).*

Goldman-Carter and McCallie 1996; Grenell and Denninger 1992; Kusler 1992; Light 1992; Marsh *et al.* 1996a,b; McElfish Jr. and Nicholas 1996; Redmond *et al.* 1996; Rogers 1996; Shabman 1992). John DeGrove, author of the preface to *Mitigation Banks: Theory and Practices* (Marsh *et al.* 1996), offered the following comment:

> *"In my opinion, mitigation banks offer a promising institutional mechanism that should be pieced into the environmental protection puzzle in a responsible and accountable way. The writers of this book raise many legitimate issues about mitigation banks, private or public, and whether they can be employed in a responsible way. I believe they can, but the rules for guiding their use must evolve with experience... We must move to a broad, watershed-planning approach if we are to ever achieve the often-embraced goal of 'no net loss' of wetlands..."*

Support for this view is illustrated by the fact that several states (e.g., Florida, New York, Wisconsin and others) are currently developing mitigation banking programs. Furthermore, the State of California's confidence in the potential of mitigation banking is demonstrated in the development of a "conservation bank" policy which applies to a number of habitats, not just wetlands (Wheeler and Stock 1995).

What Are Mitigation Banks and How Do They Work?

A wetland mitigation bank is a wetland area that has been restored, created, enhanced, or (in exceptional circumstances) preserved, which is then set aside to compensate for future conversions or losses of wetland functions and/or area due to development activities. Wetland mitigation banks may be created when a government agency, a corporation or a non-profit (non-government) organization undertakes such activities under a formal agreement with a regulatory agency. The "value" of the bank is determined by quantifying the wetland values restored or created as "credits." Approximately 100 mitigation banks are in operation or are proposed in 34 states (EPA 1995b). Much of the following discussion is based upon Marsh *et al.* (1996) and Salvesen (1990).

Under Section 404 of the *Clean Water Act*, a permit from the U.S. Army Corps of Engineers (Corps) is usually required to develop in wetlands. The Corps administers the permitting program in accordance with guidelines established by the U.S. Environmental Protection Agency (EPA). In general, prior to granting a permit, the Corps requires that proponents demonstrate compliance with the following sequence:

1. that all practical steps have been taken to avoid adversely impacting the wetland;

2. that unavoidable damage to the wetland has been minimized; and

3. that the proponent agrees to compensate for permanent destruction of wetlands by creating a new wetland or by restoring a degraded wetland.

In some situations, the EPA may wish to oppose the Corp's intent to issue a Section 404 permit. In these situations, the Issue Resolution Procedures described in Section 404(q) of the *Clean Water Act*, and summarized in EPA (1995a), must be followed.

Where compensation is required, the Corps and EPA generally prefer that the same kind of wetland be created ("in-kind") on the same site ("on-site") as the one being filled, preferably as close to the destroyed wetland as possible. This preference for "in-kind, on-site" is based upon the premise that it will increase the likelihood that the natural functions and values that are lost when a wetland is destroyed will be adequately replaced. Lewis (1992) provides a discussion of the scientific basis for on-site, off-site, in-kind and out-of-kind mitigation (compensation).

Rather than being required to create and maintain wetlands, a task they are not well trained for, proponents have the option of purchasing (credits in) a created (or restored) wetland that is maintained by someone else through a mitigation (compensation) bank. This approach offers both ecological and economic advantages (Marsh *et al.* 1996).

Rather than being required to create and maintain wetlands, a task they are not well trained for, proponents have the option of purchasing credits in a created or restored wetland that is maintained by someone else. This approach offers both ecological and economic advantages.

Marsh *et al.* (1996) note a variety of mitigation banking mechanisms to offset or compensate for (future) losses of wetlands or other wildlife habitats including:

1. Single-Owner/User Banks — the most common form of mitigation banks. They are usually established by a large company or public agency whose future development plans call for filling (i.e., destruction) of numerous small wetlands over several years. The company or agency can create a single wetland, a large block of wetlands, or a suite of wetland sites from which it can later use or withdraw credits as compensation for (future) wetland destruction, rather than creating small wetlands at each site.

2. Entrepreneurial Banks — very few exist. These banks are similar in principle to single-owner banks except that the bank is established by a landowner and/or investor and the credits can be purchased by anyone.

3. Joint Projects — common in California. These do not usually involve establishing a bank or credits for future use. Typically, a consortium of developers agree to fund a mitigation project to compensate for specific, future losses of wetlands or endangered species habitat.

The Advantages of Mitigation Banking

Mitigation banking has the potential to play a significant role in the Section 404 regulatory program by reducing uncertainty and delays, as well as improving the success of wetland mitigation efforts. Landowners/developers needing to mitigate (i.e., compensate) for authorized impacts to wetlands associated with development have the option of purchasing credits (EPA 1995b).

The U.S. EPA (1995b) and Marsh *et al.* (1996) have identified a number of additional potential advantages to mitigation banking. They are:

- banking can provide more cost effective mitigation and reduce uncertainty and delays for qualified projects, especially when the project is associated with a comprehensive planning effort such as the development of a watershed plan;
- successful mitigation can be better ensured since the wetlands have a better chance of being functional in advance of project impacts;
- banking can eliminate the temporal loss of wetland values that typically occurs when mitigation is initiated during or after the development impacts occur;
- consolidation of numerous small, isolated or fragmented mitigation projects into a single large parcel can create greater ecological benefits; and
- a mitigation bank can bring scientific, planning and financial resources together, thereby increasing the likelihood of success in a way not practical for individual mitigation efforts.

In addition, Brumbaugh (1997) noted that mitigation banking provides additional benefits to regulatory and resource agencies by enhancing the efficiency of project review and compliance monitoring efforts.

WHY HAVE SO MANY MITIGATION (COMPENSATION) PROJECTS FAILED?

There is a significant body of literature that explains why so many mitigation (compensation) projects have partially or completely failed (see Brumbaugh 1997; Garbisch 1992; Kusler and Kentula 1990; Kusler and Lassonde 1992; Marsh *et al.* 1996; and others). Understanding the reasons for these failures is important, especially for policy-makers, since, on first inspection, it would be easy to conclude that compensation and mitigation banking are doomed to failure.

Garbisch (1992) notes that many project failures are preventable. He also concludes that avoidable problems, if they have not been averted during the design and construction phases of a project, normally arise within one year after project implementation. If they do not arise this quickly, they can usually be expected to appear during the three to five year monitoring and reporting period presently required for wetland mitigation projects. Consequently, in theory, most of these problems can normally be corrected (although not always inexpensively) prior to final approval of the projects by regulatory agencies.

Garbisch also notes some problems, such as those of institutional origin, or those resulting from incorrect hydrology, may not be "fixable" after the project has been constructed. He concludes that problems of institutional origin generally result from the requirement that projects be designed and/or constructed by licensed engineers or registered landscape architects with limited or no experience in wetland mitigation.

The primary reasons for project failure, as determined through personal communications with a number of the U.S. experts identified earlier and the literature, include:

- Science — In early applications, many project failures could be attributed to a lack of science. More recently, however, a large number of project failures can be related to a failure to adequately apply existing science. Nevertheless, there are numerous science gaps that need to be filled, and there are significant differences in the adequacy of the science base for different wetland types and settings. Science around the assessment of functional losses is limited.

In early applications, many project failures could be attributed to a lack of science. More recently, however, a large number of project failures can be related to a failure to adequately apply existing

- Training — A critical deficiency. Science transfer needs to be improved. Further, there are no widely accepted standards of competency that regulators require of practitioners. Many people receive training about the ecology, but very few have training in restoration/creation science. Some training courses have been developed.

- Experience in Design and Construction — Few persons involved in the design and construction of wetlands, or in the regulation of restoration/creation projects, have significant "hands-on" experience in wetland restoration and creation. Successful project design and implementation requires expertise in a number of disciplines — not just biology or engineering or landscape ecology. Many well-designed projects have failed because persons involved in the design have not been on-site during the construction process to oversee the process.

- Goals and Objectives — Many project failures can be traced to the absence of clearly articulated goals and measurable objectives. Developing these is essential if the persons or agencies involved in project design, project authorization and project monitoring are to have a shared view of project expectations. Further, it is unlikely that the functional values that one wishes to achieve will be achieved if they are not reflected in clear objective statements.

- Compliance Monitoring and Enforcement — Compliance with permit requirements tends to be good in situations where there is a reasonable probability that the project will be monitored. In general, however, compliance monitoring and enforcement is very limited, in part because agencies lack the resources to undertake it. Consequently, many projects are not built to

specifications, and some are simply not constructed. In situations where projects have been constructed, the knowledge that compliance monitoring is unlikely to occur has resulted in a tendency to abandon projects as soon as construction is completed. As a result, those "fixable" problems, which typically become apparent soon after construction, go undetected.

- Failure to Address Long-Term Management Needs — Many created and restored wetlands require on-going management to keep them functioning as designed, and to ensure that water control and other structures are maintained. Project failures are common where long-term management needs have not been considered during the project planning stage and/or have not been implemented as prescribed.

- Rules/Procedures — In the past, there have been problems associated with the "rules" or guidelines governing mitigation (compensation) projects. In some situations, there is also a lack of political will to follow the rules. Current procedures and rules are clearer and more streamlined.

- Flexibility in Application of Rules — Initial guidelines governing the permitting process were relatively inflexible. Increased flexibility has been built into the guidelines in recent years. However, some staff are not well trained in their application. This can lead to conflicts, unnecessary time delays, increased costs and failed projects. Furthermore, even well designed projects do not always go as planned. This, as well as the principle of adaptive management, needs to be recognized and embraced by all parties.

- Roles and Responsibilities — There is considerable overlap in roles and responsibilities among the various agencies involved in administering or providing input into the permitting process. This creates both confusion and conflict. Agencies need to define their roles both individually and collectively.

- Time and Cost of Securing Approvals — As a result of the above problems, the time required to gain approvals for projects that require permits is often prohibitive (several years) and the associated costs are high. In contrast, restoration (compensation) projects that do not require Section 404 permits tend to receive approvals more quickly and at less cost.

- Ability of Regulatory System to Say "No" — The rules governing mitigation allow regulators to refuse development applications if appropriate. However, regulators are sometimes reluctant to refuse projects, even when warranted. This contributes to a net loss of special wetlands/wetland values.

- Adequacy of the Amount of Compensation Required — The amount of compensation required varies markedly between projects. Requirements should be based upon an analysis of functional and other values. Quantifying functional values is an inexact science. Consequently, some projects, even if implemented properly, do not provide enough compensation. Other projects, even when designed to provide enough compensation, have failed to do so for other reasons (e.g., failure to implement as designed, failure to maintain, etc.).

- Flexibility Regarding "On-Site" and "In Kind" Requirements — Historically, the guidelines associated with Section 404 of the *Clean Water Act* placed a very high priority on compensating as close to the site of wetland loss as possible and with the same type of wetland as was being lost. Consequently, it was difficult to obtain approval to construct projects at more distant "off-site" locations, and/or wetlands of a different type (e.g., marshes instead of swamps) even if there were ecological advantages in doing so. Now, however, increased flexibility has been incorporated into the guidelines to allow "off-site" and/or "out-of-kind" replacement in certain situations.

- Sequencing — Before compensation will be considered by regulatory agencies, guidelines developed pursuant to Section 404 of the *Clean Water Act* require that proponents demonstrate that they have made all reasonable efforts to (a) avoid impacts by considering alternative locations or designs, and (b) minimize those impacts that cannot be avoided. Unfortunately, this sequential process is not always followed, and, even when it is, there appear to be differences amongst agencies in the degree of rigor that is required to demonstrate compliance with the first two steps of the sequencing process.

In addition to the above primary reasons for failure are a number of secondary reasons. The most obvious of these are design- or construction-related problems that are most evident when poorly trained and/or inexperienced practitioners or regulators are involved in the design or delivery of wetland compensation projects. According to Garbisch (1992), these include (1) unstable site grades; (2) incorrect elevations; (3) incorrect site hydrology; (4) poor water quality; (5) substrate not suitable for plants; (6) planting with wrong species of plants; (7) unsuccessful seeding, natural or otherwise; (8) colonization by invasive exotic plants; and others.

CONCLUSIONS

The U.S. has a great deal of experience in the creation, restoration and enhancement of wetlands, in the mitigation of impacts on wetlands, in wetland compensation, and in institutional approaches to ensuring that wetland losses are minimized and that compensation is achieved where losses have occurred. Much of this experience has been gained since the *Clean Water Act* came into effect in 1972.

During that period, many compensation projects have failed, but there have also been some successes, and the trend is in the right direction — the number of failures is decreasing while the number of successes is increasing. This can be attributed to three things:

1. improved institutional processes;

2. advances in wetland creation and restoration science; and

3. improvements in the application of existing technology resulting from (a) better-trained practitioners, (b) more knowledgeable administrators and (c) better, more flexible rules.

That being said, further improvements are needed. In particular, the science around wetland creation and restoration, though adequate in some situations, remains imperfect and research is needed in a variety of areas.

The introduction of the *Clean Water Act* in 1972 also led to the concept of mitigation (compensation) banking which, in essence, is one of several possible mechanisms through which losses of wetlands can be compensated. Mitigation (compensation) banks have also suffered considerable "growing pains" in their two-plus decades of existence, and many have failed. Some of the failures can be directly attributed to the inadequacies in restoration or creation science, but many result from not applying existing, often adequate, science and technology properly. Other failures have resulted from problems in the administration of mitigation banks, in the rules governing them, or in the ability to market "banked" credits. Despite these reasons, there is a growing consensus among knowledgeable individuals that mitigation banking offers considerable potential as a viable tool in the conservation of wetlands.

In conclusion, the authors are of the opinion that compensation, if applied within the framework of a carefully constructed set of guidelines and administrative procedures, and within the limits of the available technology, has significant potential as a tool in the conservation of wetlands.

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ABSTRACTS OF PRESENTATIONS

*THE DEPARTMENT OF FISHERIES AND OCEANS' APPROACH TO FISH HABITAT MITIGATION AND COMPENSATION**

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The Department of Fisheries and Oceans (DFO) has the mandate for the conservation and protection of fish habitat, and has developed a policy framework to provide direction on this mandate. The goal of the policy is to achieve no net loss of the productive capacity of fish habitat. The application of mitigation and compensation measures is central to achieving this goal.

DFO has a policy and administrative structure in place to support its statutory obligation. Subsection 35(1) of the *Fisheries Act* prohibits the harmful alteration, disruption or destruction (HADD) of fish habitat, and subsection 35(2) provides the minister with the authority to authorize HADD. The supporting *Conservation and Protection Guidelines* describe an overall framework for the review, assessment and approval of projects with the potential to affect fish habitat, and establish a hierarchy of preferred options for fish habitat conservation and protection.

First, HADD is to be avoided by using the application of mitigation measures. DFO defines mitigation as "actions taken during the planning, design, construction and operation of works and undertakings to alleviate potential adverse effects on the productive capacity of fish habitats." Mitigation measures fall under the categories of project design (including relocation and redesigning), construction and operation measures.

If mitigation is not possible or practical, HADD may be authorized, normally only after adequate compensation is specified. DFO defines compensation as "the replacement of natural habitat, increase in the productivity of existing habitat, or maintenance of production by artificial means...where mitigation techniques and other measures are not adequate to maintain habitats (i.e., replace lost productive capacity)." Compensation categories include the following:

- Create habitat — like for like on-site;
- Create habitat — like for like off-site
- Enhance habitat — like for like on-site;
- Enhance habitat — like for like off-site
- Enhance habitat — unlike for like either off- or on-site
- Artificial propagation

* *This is an abstract only of the presentation made at the workshop.*

There is serious doubt as to whether the current policy will achieve its goal. In particular, there are difficulties with some of the operative terms from the Habitat Policy. "Productive capacity" is an integrative ecological concept and is therefore intuitively appealing, but it is difficult to apply quantitatively, which is what is called for to achieve no net loss. It is therefore also very difficult for managers to defend its application in specific situations. There is a need for defensible, science-based quantitative tools respecting productive capacity, mitigation and compensation.

*THE CANADIAN POLICY SETTING FOR IMPLEMENTING WETLAND MITIGATION**

Clayton Rubec
Canadian Wildlife Service, Environment Canada

Canada has an estimated 153 million ha of wetlands and peatlands, about 24 percent of the entire wetland resource base of the World. However, our record in inventorying and monitoring the status of these wetlands remains incomplete and inadequate. Canada was one of the first nations in the world to establish a clear wetland conservation policy. The Government of Canada announced the *Federal Policy on Wetland Conservation* in March 1992. It strongly delivers the principles of the Ramsar Convention for wetland use and protection. This Policy articulates strategies for the sustainable wise use and management of wetlands on Canada's federal lands (40 percent of Canada), cooperation with other levels of government, promotion of wetlands in all federal programs and policies, and international actions. In particular, the Policy commits the federal government to "no net loss of wetland functions" and mitigation of the impacts on wetlands of federal actions.

Wetland policies are also under development or being implemented in many Canadian provinces, each tailored to provincial environmental management concerns and responsibilities. Individual corporate sectors such as the forestry and peat harvesting industries are also implementing wetland and peatland management strategies and policies. Canada is pursuing a strong commitment to these indirect voluntary, non-regulatory approaches. Direct habitat conservation initiatives, particularly the interagency support of the North American Waterfowl Management Plan, new initiatives for private donation of ecologically sensitive lands under the *Income Tax Act* and regional and local wetland programs are widespread in Canada. Only time and careful assessment of the value of these direct and indirect approaches will reveal whether they are adequately conserving the wetlands of Canada.

** This is an abstract only of the presentation made at the workshop. For a more detailed discussion of wetland policy across Canada, contact either the Canadian Wildlife Service, Environment Canada in Hull, Quebec, or the North American Wetlands Conservation Council (Canada) in Ottawa, Ontario.*

*ONTARIO'S EXPERIENCE WITH A "NO LOSS" WETLAND POLICY: IS THERE A ROLE FOR COMPENSATION?**

Kevin K. Loftus and W. Dan Mansell[1]
Ontario Ministry of Natural Resources

Introduction

In 1992, after nearly a decade of development, the Government of Ontario introduced its first wetland policy. The policy adopted a "no loss" rather than a "no net loss" approach to the protection of wetland function and area. As such, it relied exclusively upon the avoidance and/or mitigation of impacts. Developments which were expected to result in negative impacts on wetland functions and/or area, which could not be mitigated, were to be refused. Providing compensation for unavoidable losses was not considered a viable option.[2]

Development, Implementation and Evolution of Ontario's Wetland Policy

When developing the policy, the Ontario Ministry of Natural Resources (OMNR) and the Ontario Ministry of Municipal Affairs (OMMA) wanted to develop a policy that would provide only limited flexibility, be firmly applied, and focus on impact avoidance and mitigation rather than compensation. The policy was released in June of 1992 under Section 3 of the province's *Planning Act*. Section 3 required planning authorities to "have regard to" the policy.

On private lands, the policy was to be implemented through the municipal land use planning process. The decision-maker would normally be the municipality. The OMNR's role was to provide comment during plan input and plan review. Disputes, where they occurred, were to be resolved through Ontario Municipal Board Hearings.

The policy was rigidly applied following its introduction and it was successful in protecting many wetlands. However, there was some negative reaction to the policy and the manner in which it was being applied. Some landowners who had conserved the wetlands on their properties began to think of them as liabilities, and some who understood the policy's limitations took steps to destroy their wetlands through legal activities.

** This is an abstract only of the presentation made at the workshop.*

[1] The opinions expressed are those of the authors, and do not necessarily reflect those of the Ontario Ministry of Natural Resources.

[2] Mitigation: actions taken to prevent and/or minimize the negative impacts of an undertaking on wetland function and/or area. Compensation: actions taken to offset the negative impacts of an undertaking on wetland functions and/or area, where such impacts can not, or will not, be mitigated.

In late 1994, less than three years after the wetland policy came into effect, a review of all *Planning Act* policies was undertaken, the product of which was the 1995 Comprehensive Set of Policy Statements (CSPS). The wetland policy was not changed during this review; however, Section 3 of the *Planning Act* was changed to reduce the ability of planning authorities to be flexible. Not surprisingly, in the period following the introduction of the revised policies, negative reaction to the wetland component of the policy continued to build. Late in 1995, another policy review was initiated. The wetland policy was changed as part of this review, but it remained a "no loss" policy. The *Planning Act* was also changed to give planning authorities more flexibility. The effect of these and other changes was to place increased responsibility for wetland protection on municipalities.

Finding "Win-Win" Solutions

The strict application of a "no loss" wetland policy leaves little room for the development of "win-win" solutions. In situations where planning authorities, in "having regard to" the policy and in considering other matters of provincial interest, have to choose between full protection of wetlands or allowing some form of development that will lead to some losses of wetland functions and/or area, the resource either wins or loses. The adoption of a compensation-based (i.e., no net loss) approach in some of these situations would appear to improve the chances of achieving win-win solutions.

Before a compensation-based approach could be seriously considered in Ontario, a number of perceptions had to be addressed: (a) the U.S. experience with such an approach was poor, (b) the science of wetland restoration was immature, and (c) some groups would react negatively. There was also uncertainty as to how compensation requirements would be determined. Finally, there was concern that the adoption of a compensation-based approach, even in limited situations, would eventually lead to the inability of planning authorities to refuse developments which warrant refusal. Balancing these concerns was a positive set of experiences with *Fisheries Act* compensation agreements, the 1995 Temperate Wetlands Restoration Workshop and a review of the U.S. experience (Loftus and Mansell 1998, page 31).

An analysis of the above-described concerns, and of the alternatives, led the authors to conclude that compensation is a viable tool in wetland conservation and that it should be considered in Ontario. Why?

1. It is clear that strict application of the wetland policy will not always ensure protection of wetlands, particularly given (a) the limitations of the policy, and (b) the fact that the OMNR is not the decision-maker on private lands.

2. It is inevitable that some developments that would otherwise impact wetlands will be allowed to proceed, particularly where no reasonable alternatives can be identified and/or where there are conflicts with other matters of provincial significance. In these situations, a compensation-based approach could help secure "no net loss" of area or function, or even secure a net gain.

3. A compensation-based approach would, in the opinion of the authors, achieve the intent of the wetland policy.

4. In some situations, the protection of wetlands is best secured as a condition of development. The flexibility that would result from a compensation-based approach could help foster the creativity that is required to identify "win-win" solutions.

Such an approach could also help accommodate planning commitments made prior to each policy review.

Principles of Compensation

Our conclusion that compensation has a role in the protection of wetlands in Ontario carries with it a heavy ethical consideration — that it always be applied in recognition of the best long-term interests of society. We should not destroy wetlands simply because they can be restored elsewhere. In recognition of this responsibility and in response to a number of development proposals in which compensation was being considered, or where it could have played a role, the authors developed the following draft principles:

1. avoid developments that will impact wetlands wherever possible;
2. where avoidance of impacts is not viable, mitigate all impacts of development whenever possible;
3. consider compensation only when there is no alternative — and say no where appropriate;
4. compensate as close to site of loss as possible, except where better/more wetland values can be protected by selecting more distant location, or where the long-term integrity of near sites is threatened;
5. compensate with same wetland type, except where replacement with another type would provide more benefits; and
6. assess compensation requirements on a site-by-site basis, considering functional losses, landscape setting, quality, unique values, land values, value to proponent, etc.

Experience in the U.S. indicates that such principles need to be implemented in a decision-making environment that is fair, efficient, flexible and predictable, and, further, that decisions should avoid unnecessary impacts upon private property and encourage complementary programs such as restoration, watershed planning and partnerships.

A number of additional questions need to be answered before a decision to proceed with compensation can be reached. What is the extent and value of the wetland being impacted or lost? What is the magnitude of expected losses? What is the size, setting and type of wetland being affected? What is the nature of the disturbance effects? Have the functional differences between the wetland being lost and the restored or created wetland been considered? How long will it take for the restored wetland to become fully functional and has allowance been made for any temporal

losses? Has the risk of restoration failure been assessed? Answers to these questions need to be considered in light of the economic benefits to the proponent to ensure an equitable level of compensation. Finally, compensation agreements must consider not only the design and construction of projects, but also long-term management, monitoring and administrative costs.

In conclusion, there is a role for compensation in wetland conservation efforts in Ontario and possibly in other parts of the country. However, to succeed we must proceed cautiously and we must apply the lessons learned in Canada with fish habitat compensation agreements, as well as those learned in the U.S. with wetland compensation and mitigation banking.

*WETLAND COMPENSATION AND MITIGATION: A WESTERN PERSPECTIVE**

Trevor Swerdfager
Canadian Wildlife Service — Prairie and Northern Region, Environment Canada

Agriculture defines the landscape in Prairie Canada. Conservation issues in this area revolve around water due to growing pressure for increased irrigation and other agricultural processing. Impacts on wetlands tend to be from many, small sources rather than from mega-projects, so they are difficult to monitor. Wetland compensation in the Prairies could be problematic, because it is difficult to allocate scarce water resources to wetland restoration, and there are limited geographical areas where such compensation could take place.

Habitat and wetland monitoring and inventories are inadequate in this area. In addition, wetland compensation legislative and policy tools are currently immature. Policy direction is required for mitigation and compensation in the environmental impact assessment context. There is also a need for more science related to compensation. In fact, compensation may work best for large-scale projects, but prairie wetland conservation objectives may only be achieved by preventive actions. Alternatives such as land acquisition and fiscal arrangements that capture economic rent should also be explored.

* *This is an abstract only of the presentation made at the workshop.*

*U.S. EXPERIENCE WITH WETLAND COMPENSATION: LESSONS AND RECOMMENDATIONS**

Jon Kusler
Association of State Wetland Managers

There are a number of lessons that can be drawn from a review of the U.S. experience with wetland mitigation and compensation, and a number of recommendations that could help practitioners and policy makers avoid pitfalls. This presentation focuses on four key points:

1. Promote proactive wetland restoration, creation and enhancement in non-regulatory contexts;
2. Promote compensation in regulatory contexts for and only for unavoidable losses. The reasons for avoiding and reducing losses must be clear;
3. Avoid being "led down the garden path" by a highly simplified standard of no net loss of function; and
4. To avoid being "led down the garden path" ask what you are trying to achieve with planning, regulatory and compensation policies.

Wetland compensation should only be one tool used in the conservation and protection of wetlands. The promotion of proactive wetland restoration, creation and enhancement in a non-regulatory context should also be considered. There are a number of successful problem solving, land use management and interpretation programs in the U.S., which are voluntary efforts by interested and committed individuals who want to make wetland conservation work now and in the future. Many of these include public/private partnerships, such as Circle of Flight and Partners for Wildlife, which focus on depressional wetlands.

The promotion of compensation in the regulatory context should only be for unavoidable losses, and this cannot be emphasized enough. In order to determine whether compensation is appropriate, a number of factors that are relevant to the restoration, creation or enhancement potential of the wetland must be considered. These include the type of wetland and the functions and values that need to be compensated for. Opportunity costs and societal values, such as who will benefit and who will incur costs, should also be taken into account. Other factors include the existing and potential hydrology of a site, on-site conditions such as soils, vegetation, exotic species and existing uses, proximity of the site to other wetlands and waters, the relationship of wetlands to upland habitat, surrounding land uses, possible threats to the restoration or creation project, whether active management will take place, and of course, costs.

** This is an abstract only of the presentation made at the workshop.*

There are also a number of factors, summarized in the following table, that are relevant to the determination of compensation ratios:

Factors Relevant to Determination of Mitigation (Compensation) Ratios
• The overall ecological condition (persistence, biodiversity, ecosystem integrity) of the original wetland versus the probable ecological condition of the replacement (restoration/creation) wetland
• The opportunity that Society has to make use of the original wetland versus the opportunity that Society probably has to make use of the replacement (restoration/creation) wetland
• The range and magnitude of functions/values of the original wetland versus the probable range of functions values of the replacement (restoration/creation) wetland
• The wetland type and resulting probable project success or failure for this type
• Whether restoration or creation is involved
• The expertise of the agency/consultant proposing to carry out the project
• The length of time it will take for the project to become fully functional
• Threats (if any) to the restoration (creation/enhancement) site
• Whether the project will be susceptible to "midcourse" corrections
• Whether there will be monitoring to provide the basis for "midcourse" corrections over time
• Whether active management of the project site will take place over time
• The relative costs and equities between on-site restoration/creation versus off-site restoration /creation

In addition, there should be a requirement for a combination of on-site and off-site compensation to account for the full range of impacts and issues. Hydrology, for example, should be compensated for on-site, whereas habitat loss could be compensated for off-site.

A third recommendation regarding compensation is that policy makers and practitioners avoid being "led down the garden path" (or leading themselves down the garden path) by highly simplified, quasi-scientific techniques for determination of no net loss of functions. First, maintaining wetland functions is only one reason why government agencies are trying to protect wetlands. Secondly, actually measuring the functions is problematic, and recreating all functions

may be impossible. Even assuming that enough scientific knowledge can be gained so that restoration, creation or enhancement is feasible, there is a question of who will actually do the work. Finally, if the funds and expertise are lacking so that the work cannot practically be done, the standard of no net loss of function will be compromised.

To avoid being "led down the garden path," people should go back and examine what they are trying to accomplish with planning and regulatory policies. Compensation and the restoration, creation and enhancement of wetlands must be placed in the context of broader goals and objectives. Specifically, the different wetland impacts, the different opportunities provided for compensation, and the differing needs of compensation should be considered. Water projects, large-scale development, and small fills, drainage and other alterations are all part of the context.

As a final note, anyone considering compensation should examine the experiences of other jurisdictions that have mitigation measures in place, such as the U.S., and build and improve upon them.

SUMMARY AND RECOMMENDATIONS

SUMMARY AND RECOMMENDATIONS

CONTEXT

The timing of this national workshop was most opportune. Canadian progress in the implementation of wetland programs includes provincial and federal wetland policies, actions of the Joint Ventures under NAWMP and many other activities that are leading to significant experience that is unique to our nation.

In comparison to our neighbours to the south, we, in Canada, are starting with a relatively clean slate. Participants in this workshop noted that we have the opportunity to "do it right" — both for wetlands and Society. In spite of 25 years of regulatory experience in the United States with wetlands, our American colleagues admired the ability of many Canadian jurisdictions to promote both voluntary, non-regulatory approaches and limited regulatory tools where unavoidable.

This National Workshop on Wetland Mitigation and Compensation was an opportunity to start a process for establishing principles and process in this nation. The following section summarizes some of the discussions and offers five proposed recommendations that evolved out of this meeting. The views and conclusions were not formally "endorsed" in the meeting but are offered for the consideration of the reader and participants.

The following text is divided into six sections:

A. Principles
B. Definitions
C. Sequencing
D. Compensation
E. Guidelines
F. Case Studies

PRINCIPLES

All of the jurisdictions in Canada would benefit from overall guidance in the wetland mitigation and compensation process. It is recognized that the scale of projects will vary, but both small and large development impacts on wetlands must be assessed in a predictable manner. All stakeholders need to feel that the process is fair, understandable, flexible, predictable, stable and documented.

The workshop participants developed five proposed principles for implementation of wetland mitigation and compensation initiatives:

1. The sustainability of all of the environmental, societal and economic functions and values of wetlands are vital.
2. The "impact assessment sequence" is a process based on three sequential steps: avoidance, mitigation and compensation.
3. Avoidance, mitigation and compensation are essential in the local, regional/provincial and national contexts.
4. An impact assessment process should be open, understandable, fair, predictable and flexible.
5. Compensation should be considered, but need not always be undertaken or "required," in cases where development will impact wetland functions or values.

Recommendation No. 1: A set of operational principles for the application of mitigation and compensation in wetland impact assessment projects in Canada should be developed. These could be produced for the consideration of all jurisdictions.

DEFINITIONS

It is clear that the wetland terms in this field are widely used without standard definitions in Canada. These terms include *mitigation, compensation, minimization, unavoidable, enhancement and restoration.* The term "mitigation" appears to be the most poorly understood, but is felt by many to exclusively mean the minimization step in impact assessment: "avoid," "mitigate" and "compensate." "Mitigation" is being used to mean too many different things, including all three steps of the impact assessment process.

Recommendation No. 2: An expert panel should prepare a set of standardized national definitions for key terms such as "mitigation," "compensation," "minimization," "restoration," and "avoidance" in a comprehensive way.

SEQUENCING

The sequencing process for assessing and responding to the impacts of development on wetlands remains poorly defined and poorly documented in Canada. United States experience in this field is extensive but in many cases is too intertwined with regulatory issues not relevant in Canada. Documentation is essential to measure compliance with impact assessment and regulatory decisions. The overall sequence would more clearly be described as the *"impact assessment sequence."*

Workshop participants felt that sequencing must be explained clearly with an understandable set of steps to follow. A defined process is needed to ensure adherence to the three sequencing steps: avoid, mitigate and compensate. In particular, project proponents and landowners need to know what is required for each step in this impact assessment sequence. The process must be honest, reflect due process and all stakeholders must be involved in all steps.

There is a general wish to retain the wetlands we still have — practising what we preach in policy or regulation, e.g., "no loss" and "avoid where possible." A variety of assessment considerations were highlighted:

- On/off site and in/out of kind issues must be addressed.
- Functions must be evaluated in a comprehensible manner.
- Impacts on the surrounding landscape must be included ensuring that landscape issues are integrated in the assessment.
- Evaluation methods will vary but they must always include assessment of both ecological functions and societal values.

COMPENSATION

There was general consensus that compensation must always be viewed as the last resort in the impact assessment sequence and not be designed as a project planning goal. Workshop participants considered several additional questions: (a) Should compensation always be sought for unavoidable impacts on wetlands? (b) If a constructed wetland developed as a compensation measure does not work, was it worth it? There was no consensus on these issues.

GUIDELINES

The workshop participants were urged to consider the concept of national guidelines for wetland mitigation and compensation. However, it was agreed that we are unlikely to, or will want to, come up with one set of national guidelines. Alternatively, it was agreed that it is sensible to prepare an Issues Paper with examples of guidelines. This should be made available to all jurisdictions (federal, provincial, private sector) for further refinement/development and implementation. Such a paper should lay out an array of approaches to discuss mitigation and compensation issues presented in a simple and focused manner.

It was also cautioned that this paper not be viewed as a comprehensive implementation document. It must be a nationally-applicable document identifying responsibilities and opportunities. The paper could serve as a statement and guide to the ethics of mitigation and compensation for wetland projects in Canada.

The workshop participants urged inclusion of some of these themes:

- Include a statement of the issue and principles and discuss the status and history of Canadian wetland resources.
- Propose national definitions for key terminology but recognize that provinces and other levels of government will adopt/adapt their own guidelines.
- Provide a historical context based upon both Canadian and American experience.

- Recognize that wetland mitigation efforts must be considered within the context of broad wetland programs managed by each jurisdiction.
- The role of project proponents in this exercise must be stressed.
- Review existing federal, provincial, and private sector policies, directives and legislation on mitigation and compensation requirements/responsibilities.
- Examine the partnership "way of doing business," and its operational framework.
- Outline the sequencing process: including discussion based on a planning context. The text can be presented in three major sections: avoidance, mitigation and compensation.
- Outline options for compensation measures: what can be done such as restoration, creation, banking.
- Discuss follow-up mechanisms based upon an adaptive management approach: (i) policy development; (ii) regulation/permitting; (iii) training new/turnover staff; (iv) program evaluation and assessment of cumulative effects; (v) project compliance assessment; and (vi) enforcement.
- A good recommended and annotated reading list is needed.

What role are values versus function of wetlands given in the impact assessment process? In many cases, the only issues addressed relate to functional impacts with no regard to societal values of a wetland. Do we make good decisions on an individual assessment basis or a broad (regional) plan ranking? It was clear that broad umbrella guidance is needed so that each jurisdiction might implement mitigation and compensation measures successfully.

Recommendation No. 3: A publication that would provide general guidelines, including discussion of incentives required, for applying wetland mitigation and compensation in each Canadian jurisdiction's planning programs should be produced.

Recommendation No. 4: A publication that would provide a practical framework to allow consideration for integration of wetland mitigation and compensation into other agencies Canadian jurisdiction's impact assessment programs should be produced.

CASE STUDIES

It was agreed that experience with mitigation and compensation in Canada is growing. A set of brief but informative case studies would be quite helpful to other jurisdictions. This would include actual Canadian mitigation/compensation project examples and provide simple statements of the issues considered and actions taken. The text should analyse the effectiveness of the actions adopted without criticizing the management agencies or their decision process. Case studies examining both small and large projects should be included. Internet and printed versions are necessary to reach the widest audience possible.

Recommendation No. 5: A publication outlining Canadian case studies of wetland mitigation and compensation with discussion of project issues and actions should be developed.

APPENDIX A: WORKSHOP AGENDA

Tuesday, April 22, 1997

Reception and Orientation

Wednesday, April 23, 1997

Greetings and Introduction

Kenneth W. Cox
Executive Secretary
North American Wetlands Conservation Council (Canada)

Presentations:

The Department of Fisheries and Oceans' Approach to Fish Habitat Mitigation and Compensation
Glen Hopky
Fisheries and Oceans

The Canadian Policy Setting for Implementing Wetland Mitigation
Clayton Rubec
Environment Canada

Ontario's Experience With a "No Loss" Wetland Policy: Is There a Role for Compensation?
Kevin Loftus
Ontario Ministry of Natural Resources

Wetland Compensation and Mitigation: A Western Perspective
Trevor Swerdfager
Environment Canada

U.S. Experience with Wetland Compensation: Lessons and Recommendations
Jon Kusler
Association of State Wetland Managers

Workshop Group Sessions

Plenary Session: Workshop Group Reports

U.S. Panel Discussion

Moderated by Kevin Loftus

Kevin L. Erwin	Mary Kentula
Jon Kusler	Mark Miller
Roy R. Lewis III	Pat Riexinger

Thursday, April 24, 1997

Workshop Group Sessions

Plenary Session: Workshop Group Reports

Closing and Next Steps

APPENDIX B: WORKSHOP PARTICIPANTS

Bob Bailey, Environment & Resources Inc.
Ken Brock, Environment Canada
Roy Bukowsky, Manitoba Hydro
Jean-Yves Charette, Environment Canada
Doug Chekay, Ducks Unlimited Canada
Bob Clay, Ducks Unlimited Canada
Ken Cox, North American Wetlands Conservation Council (Canada)
Randy Dibblee, Prince Edward Island Department of Environmental Resources
David Dougherty, Consulting and Audit Canada
Theresa Dupuis, North American Wetlands Conservation Council (Canada)
Mike Eckersley, Ontario Ministry of Natural Resources
Kevin L. Erwin, U.S., Kevin L. Erwin Consulting Ecologist Inc.
John Fischer, Environment Canada
Jamie Fortune, Wildlife Habitat Canada
John Gilbert, J.D. Irving Limited
James Higgins, Canadian Environment Industry Association
Glen Hopky, Fisheries and Oceans Canada
Steve Hounsell, Ontario Hydro
Richard Janusz, Manitoba Natural Resources
Fred Johnson, Ontario Ministry of Natural Resources
Pat Kehoe, New Brunswick Department of Natural Resources and Energy
Mary Kentula, U.S. Environmental Protection Agency
Manjit Kerr Upal, Terra Kerra
Jon Kusler, U.S., Association of State Wetland Managers
Robin R. Lewis III, U.S., Lewis Environmental Services Inc.
Kevin Loftus, Ontario Ministry of Natural Resources
Pauline Lynch-Stewart, Lynch-Stewart & Associates
Margaret MacDonald, Nova Scotia Department of Natural Resources
Dan Mansell, Ontario Ministry of Natural Resources
Keith McAloney, Ducks Unlimited Canada
Reg Melanson, Nova Scotia Department of Natural Resources
Livain Michaud, National Capital Commission
Bob Milko, Environment Canada
Mark Miller, U.S. Fish and Wildlife Service
Randy Milton, Nova Scotia Department of Natural Resources
Henry Murkin, Institute for Wetland and Waterfowl Research
Simon Nadeau, Canadian Pulp and Paper Association

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Jim Patterson, Consultant
Nancy Patterson, Environment Canada
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Nicole Perreault, Quebec Ministère de l'Environnement et de la Faune
Brian Potter, Ontario Ministry of Natural Resources
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